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DISEASES OF THE EYE AND EAR IN CHILDREN.



BY
J. H. BUFFUM, M.D.

PROFESSOR OF OPHTHALMOLOGY AND OTOLGY, CHICAGO HOMEOPATHIC
MEDICAL COLLEGE.



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PART II.

DISEASES OF THE EYE AND EAR.

CHAPTER I.

DISEASES OF THE EYE.

THE eyes of the infant should be carefully and thoroughly examined immediately after birth, to determine the probable condition of the function of vision, the presence or absence of congenital defects, and the possible and not infrequent retention of some of the vaginal secretions within the conjunctival sac, on the eye-ball, eye-lashes, or upon the surface of the lids.

The examination thus made may reveal evidence of the infant's eyes having suffered from inflammation, while yet *in utero*. When present such conditions are the result of syphilis, either transmitted from the father direct to the fetus, from the acquired syphilis of the mother, or from heredity of one or both parents. The affections thus occurring frequently destroy the sight, partially or wholly, before birth, and usually leave such objective changes in the eyes as to enable us to determine the part which has been diseased and also the extent of the inflammatory changes.

Following an attack of fetal iritis, we shall find the iris varying in color from that normal blue of all infants immediately after birth, the pupillary opening perhaps blocked with lymph or adherent to the lens capsule, the latter better shown by the immobility of the iris, under the influence of light varying in intensity.

The cornea may present a whitish, opaque appearance, the result of inflammatory changes in its substance, the extent of the loss of transparency presented, together with its location in the cornea, determining a proportionate loss of vision to the infant.

When an inflammation of the choroid has occurred in fetal life, no external expression of it is visible in the eyes until some days after birth, when the wandering or oscillatory movement of the eye-balls indicates to the observant physician, that the function of sight is impaired, and an ophthalmoscopic examination usually reveals changes in the choroid and retinae, suffi-

cient to account for the restless movements of the eyes of the infant in its instinctive effort for better vision. Thus, within its first month of life, in its natural endeavor to find, aside from the impaired central and most sensitive, some other portion of the retina which has been less affected by the choroiditis from which it has suffered before birth, to this apparently choreic motion, the term nystagmus has been given.

The normal visual power of the infant at the time of birth is so far without a standard; yet the function of sight of the new-born child is without doubt a progressive one.

Some years ago in a series of experimental observations upon the infants under the care of Dr. George E. Shipman at the Foundlings' Home, I was able to satisfy myself, that during the first month, the infant has but little vision except that of light perception. The impressions of objects made upon the infantile retina seemed to be absolutely of no value, except as they tended to excite in a general way, the ganglionic cells of the optical area of the cortex which constitutes the visual sphere.

In these experiments, and in the light of later investigations, the observations noted by me at that time, tend to determine the fact, that even in the first weeks of infantile life the excitation of the optic nerve-fibers, resulting from the impression upon the retina of bright lights, and such necessarily undefined forms of objects, which might be projected upon the infantile retina, are at the same time sufficient to excite a stimulus of the ganglionic cells of the optical area of the cortex so as to come within the domain of consciousness and tend toward its development.

In the early life of the infant, I am satisfied that months must pass before any permanent changes may result in the ganglionic area of the cortex, which will enable the child to retain memory pictures of the things seen.

The power of the reproduction of well-defined optical memory pictures is attained ordinarily only after the first or second year of life, and is dependent upon the frequent repetition of the same retinal excitation for the objects seen. As the infant increases in age, the repetition of similar images becoming more frequent and the objects more varied, a rapid development of its power of visual consciousness results, and the increase of the power of reproduction by the memory of those things which the child has seen, follows.

The retina, optic nerve, and the ganglionic cells of the cuneus portion of the brain in the infant, with their imperfect receptive, conductive and absorptive powers, while sufficient to receive perhaps the more or less imperfect image on the retina, and slowly transmit it through the optic nerve to the brain, it

is probable that only a transient impression upon the optical memory cells of the cortex results. Imperfect as the stimulus and its transmission may be at this age, it is at the same time of great value in the excitation of these memory cells, which later have much to do with the mental and even the physical development of the child.

The new-born infant may exhibit, at birth, some of those anomalous conditions of the eyes, which occur from arrested or imperfect development which are classed as congenital defects, which, when present, may have a visual, cosmetic, or surgical value.

To the physician who has conducted the infant into this world without other evidence of monstrosity, there is perhaps, nothing more appalling than the presentation to the nurse, or the mother, of a child without eyes (*anophthalmus*).

The infant emerging from the inner-world of the mother to the outer-world of light, separates its lids involuntarily for the purpose of stimulating its imperfect retina by the admission of light to further its development. If the lids do not open at birth and thus expose the cornea and pupil to the observation of the physician, he must determine whether the fault lies in an inability to open the eyes because of inervation of the levator of the upper lid (*congenital ptosis*); or because from arrested development the fissure of the lids has not been completed and their free margins remain united (*ankyloblepharon*); the latter condition at birth frequently covering the defect due to absence of the eye-balls (*anophthalmus*); or their imperfect development when the eyes are abnormally small (*microphthalmus*).

Among the other defects to be noticed are the absence of the eyelids (*ablepharon*) which occurs only in monstrosities; the displacement of the normal opening of the lids from a horizontal position to an angular one (*ectopia tarsi*), which gives the child a Mongolian aspect; or when there is a vertical fissure of the lids (*coloboma*), usually the upper being the one affected, although the lower or even both may exhibit this defect.

Again it may be noticed that one or both lids may be inverted (*entropion*) or there may be an over-development of the cilia and two lines of eyelashes (*distichiasis*) be present, the inner row causing irritation of the cornea and eyeball.

Sometimes a redundant fold of skin may show itself at the bridge of the nose, and by its fullness cover the inner canthus of each eye sufficiently to cause a deformity and perhaps interfere with the vision and the opening of the lids. This deformity (*epicanthus*) may be lessened or dissipated in some cases

by the removal of a vertical elliptical piece of the skin at the dorsum of the nose, and yet if the fold of skin is not too great in flat-nosed children, the deformity may disappear without operation in from four to six years, with the development of the nose bridge.

Vascular naevi or other birthmarks may exhibit themselves and require surgical treatment soon after birth, owing to their extent, or later, when in the judgment of the surgeon their disappearance with the development of the child is not probable.

The presence or absence of the lachrymal apparatus is rarely noticed immediately after birth, and it may be weeks or months later that the congenital defects of imperfect development of the puncta, canaliculus, or lachrymal ducts cause attention by the overflow of tears or the presence of pus or muco-pus at the inner canthus. The lachrymal gland in rare cases is found to be absent or undeveloped; the usefulness of the eye, however, is not necessarily impaired by its absence.

If, as is rarely the case except in lying-in asylums, foundlings' homes, or other similar institutions, a careful examination of the eyes of the new-born is made by a skilled medical attendant, other defects arising from arrested development which impair the sight are often found present in eyes which to the less skilled observer would pass for normal eyes.

The iris may be absent (irideremias), or show a cleft, the fissure being generally below (coloboma of the iris), a displacement of the pupil, inward, outward, upward, or downward (corectopia), or there may be more than one pupil (polycoria), in some cases the abnormal position of the pupil causing both imperfect vision as well as a cosmetic defect.

With the ophthalmoscope we look into the interior of the eye and find where nature failed to complete its work for the individual, as in the pupil, which should be free of all obstruction for the purpose of vision, shreds of membrane are seen to stretch across its area (persistent pupillary membrane) and which interfere more or less with the ultimate vision of the infant. It may be found that the lens is not in its normal position and that by some freak of development it is displaced (*luxatio lentis congenitalis*), or that certain layers of its tissue are opaque and a diagnosis of lammellar or zonular cataract is made. Not infrequently the whole lens is opaque at birth and congenital cataract should be diagnosed.

If the lids, cornea, iris, lens or vitreous are normal, we may find on ophthalmoscopic examination that there may be evidence of arrested development in the posterior portion of the eye, perhaps what is called a persistent hyaloid artery, a blood vessel running from the optic disk to the posterior portion of

the lens, originally intended for the development of the latter, but which failed to be absorbed and thus by its presence interferes with the vision of the eye; or there may be an opening in the choroid (coloboma) which has impaired the development and sensibility of the overlying retina at this portion.

It is not unlikely that we may find in the investigation of the depths of the eyes, that more or less of the optic nerve fibers, which enter the eyeballs through the opening in the sclera, have not been denuded of their opaque sheaths and present to our view a radiating opaque white mass which we have learned to recognize as opaque optic nerve fibers.

In some cases deposits of pigment may be observed upon or around the optic disk, but like the opaque nerve fibers, have no special relation to the visual functions unless the lesion is an extensive one.

In infancy and childhood, there are certain acute diseases of the eye, which require early recognition on the part of the physician, who should be able to diagnose and prognose the condition, even if he does not feel that he can do, from want of experience, what a specialist might. The ophthalmic surgeon is only a specialist because of years of practice confined to his department of medicine, in which he has acquired a knowledge or a technique from the large number of special eye cases which come to him, that the general practitioner cannot avail himself of.

Following the examination of the eyes of the infant as outlined above, if we should find upon the lids, eyelashes, or within the conjunctival sac of the eye any extraneous matter and our search for it should be the more thorough, if we have suspicion or knowledge of a specific disease of the genital organs of the mother, or, if a marked or acrid leucorrhœa exists, the presence of such matter endangering the eyes by possible inoculation. Such conditions, when present in the mother, are too often followed by destructive inflammation of the eyes of her infant.

OPHTHALMIA NEONATORUM, is a term applied to one of the most frequent of the inflammations of the eye in infancy, and is a purulent inflammation of the conjunctiva of the new-born child. It is a disease which is usually violent in its outset and rapidly destructive of sight.

While in the last few years, although scientific medicine has reduced the percentage of blindness resulting from it, from seventy to thirty-five, it still furnishes the largest number of the inmates of our blind asylums.

Such being the case, it is necessary that the physician who

attends mother and child, should be alert to discover the condition of the infant's eyes, and also to avoid it, if possible, by proper care of the mother before parturition.

PROPHYLAXIS.—It is important and necessary to exercise the most rigid care to prevent infection of the eyes of the infant, by careful disinfection of the vagina before and during parturition in all cases where a specific or acrid leucorrhœa, whether cervical or vaginal, exists in the mother.

When the mother presents an acrid leucorrhœal or gonorrhœal discharge, or a vaginal discharge of whatever character, the most scrupulous attention should be given to its correction prior to confinement. The use of cleansing lotions of large quantities of warm water, containing carbolic acid, boracic acid, sulphate of zinc, or glycerole of tannin, for several days prior to confinement will undoubtedly lessen the danger of infection. After the birth of the child, and before the cord is severed, the physician should at once cleanse the eyelids with bits of soft linen, or absorbent cotton; remove all secretion from the cilia, and wash the eyelids and surrounding parts in a saturated solution of boracic acid.

When we have reason to suspect that danger of inoculation is probable, we should, as soon as the child has been otherwise cared for, evert the lids to discover and remove any of the unctuous material mixed with leucorrhœal discharge which may have insinuated itself beneath the lid, and found a resting-place upon the folds of the conjunctiva.

Symptoms and Diagnosis.—The most typical cases of ophthalmia neonatorum occur from twelve to seventy hours after birth. Usually before the third day we find the eyelids somewhat reddened, slightly swollen, and a slight flow of tears. Eversion of the lids will show bright red transverse lines occupying the middle of the palpebral conjunctiva; shortly after this, the edges and angles of the lids become red, and perhaps painful on pressure. The ocular conjunctiva is next to become involved; it appears bright red, and the swelling of the lids increases. The discharge which at first was almost entirely of tears, now becomes serous, and gradually assumes the appearance of turbid whey. There is considerable photophobia, which causes the infant to close the lids tightly, so that some difficulty is experienced in opening them. This closes the first stage. The second stage, or that of suppuration, is ushered in usually by a marked increase in the swelling of the lids. This swelling increases so rapidly that often in twenty-four hours they cannot be separated without considerable force. The upper lid usually overlaps the lower one, and, in most cases, is

so stiff that it is difficult or impossible to turn it. On separating the lids the exposed conjunctiva is thickened, perhaps raised in folds, and of a diffused bright red hue through which the sclera can be dimly seen. At first there is a muco-purulent coating over the entire conjunctival surface; the discharge soon becomes more abundant and decidedly purulent, and later is thick and creamy. The effusion into the conjunctiva is generally serous and causes chemosis or swelling of the conjunctiva of the eyeball and protrusion of the lids, but in some cases contains much fibrin, and the conjunctiva presents a raised and resisting surface in that portion; this condition arises more particularly in the course of gonorrhœal infection, and is, of necessity, very grave, owing to the danger to the cornea from the compression of the vessels which supply it. When the effusion is very great, the swelling of the ocular portion may extrude between the lids, and the palpebral swelling causes eversion of the lids, the latter giving rise to a spasmodic action of the orbicularis, or blepharospasm, which, by increasing the pressure upon the eyeball, causes increased danger to the cornea.

As the inflammation increases the secretion of pus becomes enormous, considering the small area of the suppurating surface. The free edges of the lids are stuck together by the discharge drying upon them, and their separation causes the discharge to gush out with some force, and oftentimes with danger to the operator. The cornea is thus kept macerating in the imprisoned pus. The cutaneous surface of the lids is livid, traversed by enlarged veins from the passive congestion. Early in the second stage it is usual to notice unmistakable signs of pain. There may be some marked febrile reaction, the child becomes restless and refuses the breast. If the local affection is slight, the child usually thrives. In the majority of cases of ophthalmia there is no further advance of the disease; the inflammation having reached its height now begins to subside, and usually results in complete recovery, without sequelæ. Some cases, however, pass into a chronic catarrhal inflammatory condition, and in others the papillæ become hypertrophied or true granulations result. If the cases do not end here, irreparable damage results from the third stage which is entered upon, in which we have involvement of the cornea in the inflammation. This complication is more frequently the result of gonorrhœal infection or of badly treated or neglected cases.

The cornea may exhibit the effect of the destructive process at small points or over its whole surface. The corneal affection usually appears in from eight to ten days after the disease has become established. The corneal epithelium is lost from con-

stant maceration in the pus, and the cornea presents at first a hazy or milky appearance, which soon becomes yellowish and finally ends in complete suppuration, rupture of the cornea and, perhaps, loss of the lens, extrusion of the iris and atrophy of the bulb. If the disease is arrested before suppuration of the cornea is complete the eye recovers with a nebulous cornea, presenting much the appearance of ground glass; this condition may clear up very much owing to the activity of the absorbents in infancy, a result which may be hastened by the assistance of certain homeopathic remedies.

In another class of cases we may have one or more minute grayish points of corneal infiltration and softening which give rise to ulceration and perforation. In others still, the whole cornea may slough, as the result of the strangulation of the vessels by the chemotic swelling, so that on the second or third day the eye is entirely destroyed. In the milder cases of strangulation of the blood-vessels of the cornea which nourish it, there may be one or more rapidly spreading central or marginal ulcers, which appear as if portions of the cornea had been chipped out, with clean cut edges and transparent bases which are difficult to detect unless viewed by oblique illumination. These are more difficult to heal than the others; the edges become rounded, blood-vessels develop in them and they rapidly fill up.

As a rule, both eyes are affected simultaneously, or in rapid succession; at times, one eye is infected and the other remains free. In all cases the eye should be carefully examined by the medical attendant, and to do this, the discharge should be carefully removed from the lid margins and lashes, and then the eyelids separated by the fingers applied above and below, or if necessary, small retractors should be used; having in this manner obtained a view of the whole anterior portion of the eyeball, the cornea should be thoroughly examined. The duration of the disease is from three to six weeks, and much longer if improperly treated, or neglected.

Treatment.—The eyes should be shaded from the light, but it is not necessary to confine the infant to a darkened room; rather place it in a light and well-ventilated apartment. The success of the treatment depends upon the frequent removal of the discharges, the eyes being constantly cleansed with scraps of old linen or bits of absorbent cotton, and the further cleansing of the eyes with solutions of chlorine water diluted one-half, boracic acid (gr. x. ad fʒi.), or arg. nit. (gr. i. ad fʒi.) injected into the eye from an eye-dropper, and the use of vaseline to the lid edges will be sufficient to carry the majority of cases to a favorable termination without other remedies. The use of cold



compresses is not applicable to such young infants, but in case corneal affections appear, frequent bathing of the eyes with warm water every five minutes during the day, and every quarter-hour at night, and the use of a solution of atropine (gr. $\frac{1}{8}$ ad f_3 i.), one drop every three hours, will be indicated. The careful following of the directions for the removal of the discharge and the administration of arg. nit., 6th to 30th, puls., merc. or hepar sulph., will be sufficient to bring the cases to a favorable termination. Other remedies may be useful and their indications will be found under Conjunctivitis Purulenta.

CATARRHAL CONJUNCTIVITIS of the new-born infant often presents itself within the first weeks of its new life. The secretion of the inflamed conjunctiva is often muco-purulent, instead of being mucoid; the lessened intensity of the symptoms enables us to differentiate this affection from that just described.

Etiology.—The inflammation seems to arise from exposure to varying temperature, to want of proper protection during the bath, the want of proper hygienic surroundings, carelessness upon the part of the nurse in cleansing the eyes or the transference of foreign matter to the eyes from the fingers or cloths used by the attendant. Undoubtedly the exposure of the eyes of the infant to strong and bright lights, occasions in some cases the inflammatory reaction.

Symptoms.—There is usually some swelling of the lids, the eyeballs present a more or less bloodshot appearance. There is also anxiety and restlessness of the child due to the discomfort of the eyes, which interferes with its sleep.

The discharge, at first watery, becomes mucoid, collects upon the lids and eyelashes and causes their adherence.

The discharge never presents that yellowish color, creamy consistence nor quantity that is found in the purulent conjunctivitis.

Prognosis.—As the symptoms are more mild than in the purulent form, the danger to vision is slight, as the cornea is seldom affected, and the disease is capable of spontaneous cure in the majority of cases, within a week or two of its inception. The greatest danger is from a possible chronicity, which may occasion the development of true trachoma or granular lids later, as is commonly the case in ophthalmia neonatorum.

Treatment.—The use of some mild collyria, such as the borax, boracic, alum or tannic acid glycerine, together with the internal use of aconite, euphrasia, hydrastis, sulphur, mercur-

rius, or argent nit., are sufficient to hasten the cure and lessen the danger of any chronic condition resulting.

PHLYCTENULAR OR PUSTULAR CONJUNCTIVITIS is a recurrent form of inflammation, characterized by the appearance of one or more vesicles or papules upon the ocular conjunctiva, supposedly around the terminal filaments of the branches of the fifth nerve, and often occurring near the cornea. Each papule or phlyctenule forms a small patch of localized congestion towards which converge a leash of vessels which can frequently be traced back to the folds of the conjunctiva. These phlyctenules may present a semi-transparent or yellowish elevation or be more flat, large, and give the appearance of a gelatinous infiltration at that point. There may be one or many scattered over the ocular conjunctiva, or aggregated at the corneal margin, or they may encircle it and appear upon the cornea also. In a few days the vesicle which forms the summit of the phlyctenule, ruptures and leaves a shallow ulcer with a yellowish base which heals in a few days. In some cases small points of congestion only, appear and after a short time subside without the formation of a vesicle. The pain is usually not severe, the photophobia or dread of light variable, and in some cases very slight, in others, intense and accompanied by severe blepharospasm. The secretion is commonly scant and mucoid in character.

The disease shows a great tendency to recur and the phlyctenules appear in successive crops after the lapse of weeks or months. They are very prone to appear in the winter and spring. Children have a peculiar liability to the disease, as it is only rarely seen in adults, and may be considered as indicative of some derangement of the general health. It is common to delicate and ill-nourished children, particularly those who live upon an almost exclusively starch diet, or use tea and coffee.

Treatment.—The treatment consists in the improvement of the general tone of the patient, and the restriction of such nerve stimulants as tea and coffee. The patient should be urged to live upon a mixed diet, as many cases cannot be cured until a moderate amount of nitrogenous food enters into the daily nourishment. External applications are rarely necessary, as the cure is much more rapid and permanent by the use of internal remedies than with topical applications. Of the latter, those which are generally recommended are the yellow ointment, a small bit of which is introduced between the lids and allowed to melt upon the conjunctiva, calomel or flowers of sulphur dusted upon the phlyctenule, or solutions of merc. nit. dropped into the eye.

REMEDIES.

Sulphur.—Very frequently indicated in cases occurring in scrofulous children. Its sphere of action is very wide and suits a great variety of cases of pustulous inflammation of the conjunctiva, and is particularly indicated when there are sharp, darting, lancinating pains, or as if pins and needles were sticking in the eye during the day, or if the pains aggravate after midnight. There may also be itching, often a thickened condition of the lid and much rubbing of the eyes. The photophobia is variable and may be quite marked in the morning. The lachrymation is usually profuse and the lids generally stick together on awakening.

There is often an eczematous condition of the lids, face and head, and general aggravation from the application of cold water, or from bathing the eyes.

Pulsatilla.—The phlyctenules are more frequently of the small variety, but often numerous; the photophobia or pain is commonly slight and the redness variable. The lachrymation and discharge are moderate and bland, although it is not contra-indicated if the secretions are profuse. Particularly suitable to the blonde women and children upon whom pulsatilla seems to have so good an action.

Mercurius Sol.—A valuable remedy in many cases of phlyctenular inflammation in strumous or syphilitic children. There is usually marked redness of the conjunctiva, and violent photophobia, so that all light must be excluded, and the discharge usually thin and acrid. The pains are severe and neuralgic in character, affecting the temporal side of the head and face. They are variously described as burning, sharp, tearing, and lancinating, and aggravated in the evening and from the exposure of the eyes to artificial light, by heat and damp weather, while there is a temporary relief from application of cold water to the eyes. The lids are often thick and swollen and spasmodically closed and excoriated by the discharge.

Merc. Cor.—Indicated in the aggravated form of inflammation occurring in scrofulous children. The symptoms are much more marked than in the other preparations of mercury, the pains, photophobia, lachrymation, all being aggravated; the nostrils are often excoriated by the acrid discharge from the eye, passing down into the nose.

Mercurius Dulcis.—Although calomel is used very extensively by the old school in scrofulous ophthalmia, it is but rarely applicable to phlyctenular inflammation; some cases, occurring in pale, flabby subjects, with excoriation of the nose, and swelling of the upper lip, have been benefited.

Mercurius Nit.—This remedy, recommended by Dr. Liebold, was used by him with remarkable success in a great variety of cases of phlyctenular inflammation. It seems to suit severe as well as mild affections, acute or chronic, with or without much photophobia, and in some cases presenting severe pain, in others where the pain is absent. It may be used both internally and externally. If externally, ten grains of the first decimal trituration are to be dissolved in two drachms of water and applied by means of a camel's hair brush to the phlyctenule two or three times a day.

Graphites.—This is one of the most valuable remedies we have for all forms of phlyctenular inflammation. It is useful in both the acute and chronic forms, particularly in cases where there is a marked tendency toward recurrence. It is specially indicated in scrofulous cases, or with exanthematous eruptions about the head or behind the ears, particularly where the eruptions are glutinous, fissured and bleed easily. The photophobia is usually very marked, and the lachrymation profuse, although in some cases nearly or entirely absent. There is generally a greater aggravation from sunlight than from gas-light, and in the morning, so that often the child cannot open the eyes before nine or ten o'clock. The conjunctiva is frequently very red, and the discharges are muco-purulent, constant, thin and excoriating. The pains are variable and not characteristic, the lids are sore, red and agglutinated in the morning, or else covered with dry crusts, while the external canthi are fissured and bleed easily upon opening the eye. There may be also an acrid discharge from the nose accompanying the eye affection.

Calc. Carb.—Phlyctenules occurring in fat, unhealthy children, with pale flabby skin and enlarged glands. The photophobia is often excessive, and the lachrymation very great and often acrid. The redness and pains (sticking in character) are variable and the lids perhaps swollen and glued together in the morning.

Calc. Sulph.—Will prove exceedingly valuable in many cases when the general symptoms of calcarea are present with enlargement of the cervical glands. The lower attenuations should be used.

Hepar Sulph.—Is adapted to phlyctenular inflammation occurring after measles, or in strumous children, where there is intense photophobia, lachrymation, an injection of the conjunctiva with swelling of the lids, sensitiveness to touch and a desire to have them covered, and when the external canthi bleed easily on opening them.

Arsenicum.—Cases occurring in thin, ill-nourished children,

without marked inflammatory symptoms. There is usually intense photophobia, and profuse, acrid lachrymation. The phlyctenules tend to form ulcers which extend superficially and take on an indolent character.

Rhus Tox.—Where there is excessive photophobia, lachrymation and spasmotic closure of the lids. There is generally a vesicular or pustular eruption upon the eyelids or face. Antim. tart., ipec., kali.bi., mez., crot. tig., euphrasia, sepia, and baryta, are also serviceable in phlyctenular conjunctivitis and will give prompt results when indicated.

ULCERS OF THE CORNEA are of frequent occurrence among children, but less so among infants. The most simple form of ulceration of the cornea is that exhibited by a grayish-white spot which is usually located at the center of the cornea. It is often not examined early enough to show its flattened conical elevation presented in the first stage, the later development exhibiting a slight depression of the cornea with perhaps little of the grayish infiltration which marked its beginning.

The photophobia, congestion of the eye and swelling of the lids, are variable symptoms which also seem to bear by their intensity no ratio to the duration or extent of the ulcer.

As these ulcers commonly attack the central portion of the cornea, their danger to vision is great, as they usually attack one eye at a time, and tend to recur in the same or the other eye. The opacity or scar thus left is greater in those cases where the repeated ulceration has caused the greater loss of transparency. The central location of the opacity causes such a marked interference with the function of vision in many cases as to destroy the sight entirely. In cases where the ulceration is acute in its course and heals rapidly, the destruction of tissue and loss of transparency is much less than in those which present a chronic and recurrent character. In some cases the repair of the lost substance is not completed and a flattening of the curve of the cornea occurs at the site of ulceration which interferes greatly with the vision.

It should be borne in mind that these ulcers now and then tend to spread, and take on a suppurative character, when this occurs the danger becomes very great. The original infiltration sometimes passes rapidly to the formation of an abscess of the cornea, with extensive destruction of tissue and loss of the eye. When an abscess is forming, a small spot slightly raised appears, accompanied by much pain and congestion. It enlarges rapidly, becomes yellow in color and commonly ruptures outward, leaving a more or less deep, round ulceration with a yellowish, purulent infiltration, which may ultimately

destroy the cornea. Sometimes the abscess may open into the anterior chamber, and hypopyon, a collection of pus in this part of the eye, results.

The causes which give rise to these destructive attacks are, in my opinion, invariably those due to malnutrition, defective nourishment, and a strumous habit, with bad hygienic surroundings.

PHLYCTENULAR ULCERS (phlyctenular keratitis, pustular ophthalmia, marginal keratitis, strumous or scrofulous ophthalmia) constitute the larger number of ulcerations of the cornea occurring during childhood.

The causes which give rise to them are the same as those which have already been indicated as producing the central ulcerations.

The symptoms are first, photophobia, that one which is usually most marked and which is common to all corneal inflammations or ulcerations. The dread of the light varies with the development of the phlyctenule or pustule upon the cornea, being often slight in the first stage and moderate later, or intense to a degree that there is no place sufficiently dark to enable the child to open its eyes.

This over-sensitiveness to light causes, as a reflex, a marked spasmodic closing of the lids. The blepharospasm is often one of the most painful and most annoying of the symptoms which occur in this disease. The child is inclined to lie with its face buried in the pillow, or the lap of the mother, or seek the darkest corner of the room and cover the eyes with the hands.

A pustular eruption is often present on the face and lids. The constant discharge of mucus from the nose, owing to the irritating qualities of the secretion from the eyes which passes into the nose, gives rise to the common idea that the child is suffering from a cold in the head.

If the lids are separated, and it often requires considerable force upon the part of the examiner to do so (unless he has instilled a drop of a 2-per-cent. solution of cocaine at intervals of two or three minutes for two or three times), we find perhaps only a single spot upon the cornea with a triangular-shaped injection of blood-vessels radiating from it. There may, however, be several of these phlyctenules situated upon different portions of the cornea or arranged in ring-shape at the margin of the cornea, often encircling its whole periphery. These pustules vary in size from a small point to those of two or three millimeters in diameter. They are due to exudation of serum beneath the epithelial layers of the cornea and usually about the terminal filaments of the branches of the fifth

nerve which supply it. The phlyctenule, bleb or pustule thus formed by the exudation is raised above the surface of the cornea, and contains within its cavity serum, a few leucocytes, or some white corpuscles. Its top may appear yellow, but more often when seen the surface is abraded and it has a grayish and aphthous look. The eruption may be resolved without breaking down in some cases, but the majority rupture and ulcers result. The rupture is followed by rapid healing in some cases. More frequently, however, the ulcer takes on a sluggish condition and becomes a source of much discomfort to the child and danger to its vision.

The congestion of the eyeball and cornea as well as the pain vary extremely in degree in different cases, the congestion being usually confined to that part of the sclera immediately surrounding the cornea, but may involve the whole of the sclera as well.

The pain is usually referred to the parts about the eye in those cases when the child is old enough to describe it, or involves the whole head when there is great photophobia and the eyes are exposed to the light.

Treatment should consist, first, in the attempt to correct the nutrition by regulation of diet, the increase of the nourishment by the addition of those condensed foods which are now so well prepared and which are usually readily digested and assimilated. My preference in those cases has been for those that are made from beef. Murdock's Food, Bovinine and certain of the beef extracts are of the greatest value in supplying to the blood those elements which are so necessary for the protection of the cornea, which derives its nourishment only indirectly from the blood-vessels, so that if the blood is not in a well-nourished state, by the time it reaches, in its diluted condition, the central portion of the cornea, there is not enough nourishment in it to maintain the vitality of the part and the ulceration and destruction begin.

Second, in the effort to accomplish an early repair of the ulceration by such local applications and measures as may be deemed expedient. Among the possible aids in this direction may be mentioned the probable necessity of keeping the eye quiet by bandaging in the effort to hasten the healing process. As a rule, I do not advise the bandaging of the eyes of very young children except in special cases, as its good results depend much upon the judgment and experience of the medical attendant in these cases. In childhood and youth the bandage is likely to do more good and less harm than in infancy. The objection to close bandaging is due to the confinement of the secretions, often acrid, within the eye, which thus increases

rather than diminishes the inflammatory process and the inability of the attendant to properly readjust the bandage when its removal may be so often necessary for the purpose of instilling the collyrium (boracic acid grs. viii. to $\frac{1}{3}$ i.) which is intended to lessen the irritation arising from the increased or changed secretion, or the application of lotions (chlorine water diluted one half, saturated solution of boracic acid, or bi-chloride sol. i to 10m), intended to act as germicides and thus lessen the danger of further infective extension of the ulcerative process.

Third, to stimulate the healing of the ulcers, especially in those indolent cases which cause all so much anxiety, by such applications as calomel, finely divided flowers of sulphur, which are gently dusted upon the ulceration, or the use of a minute portion of an ointment made of cosmoline, $\frac{1}{2}$ ad grs. ii. hydrg-ox-flav., which is introduced between the lids and rubbed upon the eyeball.

Fourth, to relieve the photophobia by the use of smoke-tinted goggles or in less severe cases the visor-eye-shade may enable the child to get that stimulus from light, fresh air and exercise that it most needs and without detriment to its eyes. The pain should be relieved as far as may be possible by the occasional use of atropine solution ($\frac{1}{8}$ gr. to 2 gr. to the $\frac{1}{3}$ i.), when the ciliary congestion is marked, or much relief may be obtained from hydro-chlorate of cocaine (2 per cent. sol. a drop once or twice a day).

Fifth, benefit sometimes follows the application of hot fomentations or poultices; the latter, however, should never be applied except when directed by the ophthalmic surgeon, as their use is more likely to do harm than good; poultices being usually indicated only in those cases where the cornea presents an abscess of considerable extent, a suppurative ulceration, causing rapid destruction or a necrotic condition is imminent. In some cases it may be necessary to apply the electric cautery in the effort to limit the destructive process. In all cases where the physician is in doubt about the necessity for, or the value of topical applications which in his judgment might be detrimental, it is better to await for a day or two the result of the internal medicines which he has prescribed, as in some of these severe cases, it is impossible for those who are skilled by judgment and experience to advise with certainty those local measures which may be best in certain cases.

The internal medications necessary for the cure of these ulcerations of the cornea of children, have a more reaching effect than the local measures mentioned and are more rapid in their action in controlling and limiting their destructive influences.

REMEDIES.

Aconite.—Superficial ulcers arising from injuries. It may be used both internally and externally.

Arsenicum.—Corneal ulcers occurring in weak, anaemic children. They are often superficial and have a tendency to recur. The photophobia is excessive and the lachrymation acrid and burning. The pains are more frequently burning and aggravated after midnight. Small grayish central ulcers which occur in young children and tend to perforate.

Aurum.—Vascular ulceration of the cornea and ulcerations occurring during the course of pannus, or as the result of abscess. There is much photophobia, profuse scalding lachrymation and sensitiveness of the eye to touch, and pains apparently extending from the parts around the eye to the eye, and aggravated by touch.

Calc. Carb. and Calc. Hyperphos.—Ulcerations occurring in ill-nourished patients which show a tendency to slough, or which result from abscess.

Conium.—Some superficial ulcers without much pain or redness, but with intense photophobia.

Graphites.—In some cases of ulceration of the cornea which have followed attacks of phlyctenular inflammation of the cornea or conjunctiva.

Hepar Sulphur.—A valuable remedy for all ulcers or abscesses where there is pus in the anterior chamber. There is usually a marked sloughing tendency and the pain is throbbing and the photophobia intense, while the conjunctiva is often red and thickened or chemosed. There is relief generally from bandaging the eye and the application of warm compresses, although there is great sensitiveness of the eye to touch.

Ignatia.—Small chipping ulcers without much discomfort, which occur in connection with derangements of the digestion; also small pinhole ulcers, which are attended by photophobia and sensation as if something was in the eye, in nervous and hysterical patients.

Mercurius.—Often indicated in both superficial and deep ulcerations. There is generally grayish infiltration of the base and around the ulcer, which is also often vascular. The discharges from the eye are profuse, thin and excoriating. There is a general aggravation at night. Concomitant symptoms more frequently decide upon the particular form of mercury to be administered; the eye symptoms indicating merc. cor. being more intense and there is much ciliary injection and pain.

Merc. Nit.—More useful in those ulcerations which partake of a phlyctenular character.

Merc. Prot.—Ulcerations occurring with pannus; its efficacy in *ulcus serpens* is very doubtful and it has not proved as useful as calc. phos. or silicia in these cases.

Nux Vomica and *Pulsatilla* suit some cases of superficial ulcerations with intense photophobia, and it becomes very difficult to differentiate between them when marked concomitant symptoms are not present.

Silicia.—Indicated in some cases of sloughing ulcers of the cornea, as in the marginal ulcer, and when small, funnel-shaped non-vascular ulcers appear near the center of the cornea and rapidly perforate.

Sulphur.—When the ulceration is indolent and tends to slough this remedy will be useful. There is often considerable infiltration around the ulcer, but no vascularity. The photophobia, lachrymation and other symptoms are variable. The sharp, sticking pains, which are commonly present and worse after midnight, are very characteristic. The subjects are strumous and the general condition is indicative of sulphur. Many other remedies may have to be consulted for individual cases.

DIFFUSE KERATITIS (syphilitic, interstitial, parenchymatous, strumous or scrofulous keratitis), is an inflammation of the cornea which essentially is a disease of childhood. It occurs commonly between the ages of five and twelve, some cases being reported between the second and third year, and very rarely later than the fifteenth year, and still much more rare in adult life.

Etiology.—Inherited syphilis is the undoubted cause of this disease, and in children in which it presents itself we have the physiognomy, notched teeth, skin, mouth and bones which we have learned to regard as positive indications of syphilitic inheritance. In the absence of these signs, we may have to assign as the cause a scrofulous or strumous habit; or with other symptoms it may be coincident with the secondary stage of acquired syphilis, the latter, however, being extremely rare.

Symptoms.—A grayish opacity first shows itself at the center of the cornea in the tissue, and gradually extends with increasing density, until the whole cornea has lost its transparency. Again, the opacity may begin at one or more places near the margin of the cornea and extend to the center. These changes in the cornea which mark the beginning of a chronic inflammation of its tissue, and which does not go on to ulceration or abscess, are ushered in by a preliminary stage, often overlooked, of injection of the sclera about the margin of the cornea, and a watery appearance of the eye from increased lachrymation. The sight is rapidly lost, and if the disease attacks both cor-

neas, as may be the case, though usually the disease is well advanced in one before the other is affected, the first symptom noticed in young children is the falls the child suffers from, owing to its imperfect vision.

It is rare that more than a few months intervenes before the second eye is attacked, and extremely rare that a year or more elapses, as the disease is commonly symmetrical.

In from two to four weeks the cornea becomes so opaque that the iris and pupil are no longer seen, and the grayish-white appearance looks like ground or frosted glass, its surface roughened from the loss of portions of its epithelium. An inflammation of the iris often complicates the attack, and by adherence to the lens capsule (posterior synechia), lessens the recovery of vision, as well as increasing the discomfort of the sufferer. The pain, if the iris does not become involved, is not marked, and the dread of light is perhaps less marked in this, than any other disease of the cornea.

The opacity, on close examination, is found in many cases to be of unequal density, or may present a reddish color due to the development of blood-vessels in the layers of the cornea. This vascularity may involve the whole or only portions of the cornea, and may be regarded as an indication of a more serious attack than when absent.

Prognosis.—The duration of the attack is prolonged from six months to two years, and when the diagnosis is made, the parents of the child should be informed of the probable time to be consumed in the development of the various stages, and that the ultimate recovery is reasonably sure. While the prognosis as regards the vision is good, the cornea rarely recovers its perfect transparency. Relapses are not infrequent, and complications of the iris, choroid, retina and glaucoma may occur, rendering the prognosis more grave.

Treatment.—Homeopathic remedies have the power, when properly used, to lessen not only the severity of the attack and mitigate its symptoms, but also to shorten its duration in a remarkable manner.

No local applications, except that of atropine in cases of iritic complications, or the occasional use of cocaine for temporary anesthetic purposes, are advisable, as indeed all others are harmful. In rare cases hot compresses may be of value, but should only be applied under skillful direction.

As these patients are often anaemic or present indications of impaired nutrition, particular attention must be given to proper feeding or necessary stimulation.

The indications for the remedies should be carefully studied; these given here constitute the ones more frequently needed.

REMEDIES.

Aurum Mur.—This preparation is one of the most frequently indicated in cases of syphilitic keratitis. The symptoms are those of diffuse infiltration with moderate photophobia, and pain which is of a dull character and referred to the parts about the eye.

Mercurius Sol.—The inflammation is more active; there is usually more pain, greater ciliary injection and nocturnal aggravation than under aurum, and the general concomitants of mercury are present.

Mercurius Prot.—Often useful when merc. sol. does not act promptly.

Arsenicum.—Diffuse keratitis with marginal vascularity. The photophobia is intense, the lachrymation profuse, and burning pains are complained of. The aggravation after midnight, restlessness and thirst are commonly present.

Apis Mel.—With the infiltration of the cornea there is moderate injection of the ciliary region and photophobia. Febrile disturbance, thirst, and drowsiness often accompany the condition.

Hepar Sulphur.—Often serviceable when there is much ciliary injection or pain, great photophobia, lachrymation and sensitiveness of the eye to the touch.

Baryta Iod.—When enlargement of the cervical glands, which are hard and painful on pressure, accompany the diseases of the cornea.

Kali Mur.—Interstitial keratitis with occasional pain, moderate photophobia and redness.

OPACITIES OF THE CORNEA, resulting from the various inflammatory affections of the cornea, are termed leucoma, macula, and nebula according to the density of the scar, the former being the most dense. When their location is not central the vision may not be affected, but when located over the pupil the vision is destroyed in proportion to the thickness of the opacity.

In children the prospect of gradual absorption is good, but it is rare that the vision becomes as good as it was before the affection, which caused its appearance, occurred. The lessening of the opacity as the child grows older lessens the cosmetic defect of the eye, even if the vision is not impaired. When these opacities are central and occur in both eyes, they give rise to nystagmus, that oscillating, restless movement of the eyes which occurs when, owing to the impairment of its central vision, the child endeavors to fix the eyes upon the object so that a better image may be obtained through the more transparent

portions of the cornea. In cases where it is bilateral, divergent squint occurs, or when unilateral it may be a cause of convergent squint.

The treatment consists of the use of such homeopathic remedies as hepar sulph., calc. carb., silicea and sulphur, which in some cases exhibit a marked influence in occasioning rapidity of tissue change after inflammatory processes. In addition certain drugs, which, when applied to the scar, occasion a temporary congestion or mild inflammation and hasten its clearing, merc. nit., boracic acid powder, sulphate of soda or resorcin, when applied by means of a small swab of cotton, giving the best results.

When both eyes present a central opacity, or the vision only resides in the one affected by the scar, a new pupil should be formed by making an iridectomy in the direction of the most transparent portion of the cornea remaining.

When in older children or adults the leucoma is a source of great disfigurement, it may be tattooed with india ink.

STAPHYLOMA of the cornea, a bulging projection of the cornea which occurs frequently in children, results from either perforation of the cornea and prolapse of the iris following ulceration in purulent forms of conjunctivitis, or from the softening of the corneal tissue which accompanies some cases of chronic phlyctenular inflammations with increased fluid pressure within the eye.

If the bulging involves the whole of the cornea, it is apt to continue until it becomes a serious deformity and protrudes between the lids, notwithstanding our efforts to lessen the tension by frequent tappings of the anterior chamber (paracentesis corneae), or the removal of a portion of the iris (iridectomy). When it is complete, and subjected to irritation, inflammation of the ball occurs and it becomes necessary to remove the projecting portion (abscission) or remove the eyeball (enucleation).

BLEPHARITIS MARGINALIS (*ophthalmia tarsi, tinea tarsi, acne ciliaris, blepharo adenitis*), the free margins of the eyelids containing the meibomian glands, the cilia, sebaceous and modified perspiratory glands are liable to acute and chronic inflammation in infancy and childhood. With the terminal circulation of the blood supply at their borders, the high development of glandular structure within them and transition from skin to mucous membrane which occurs at their movable edges, are presented anatomical conditions which may readily acquire a pathological state by inflammatory changes due to heredity,

impoverished blood, external irritation, or reflex eye strain due to errors of refraction.

Various types of the disease may be described and the disease may affect both lids of the eyes, or only a single lid or part of it.

In the more simple cases an incrustation about the base of the cilia, resulting in a pyramidal or conical formation from an increased secretion from the sebaceous glands at the roots of the eyelashes presents the condition which is distinguished often by the laity as "granular lids," a misnomer always.

Some cases may present only a superficial eczema, characterized by slight redness, with dry or moist scales which form upon the lid-edges, but do not form masses clinging to the eyelashes, as in the former type. These types may soon lose the simplicity by the lid-border becoming red, the glands and eyelash follicles inflaming and the lid-margin thickening, yellow points due to purulent infiltration present themselves, ulceration more or less deep of the lid-margins follows. The chronic process set up in the appendages of the eye, results in the loss of the cilia, the destruction of the lid-margins or their deformity. The cosmetic defect produced by the ravages of this disease is perhaps more readily noticed than that of diseases of the eyeball which destroy its beauty or the function of sight.

Etiology.—This affection of the eyelids begins often early in childhood and infancy, and is due either to heredity, malnutrition, or follows as a sequela of the eruptive fevers, of the latter, measles perhaps furnishing more commonly the exciting cause. Chronic catarrhal affections of the conjunctiva and lachrymal sac both cause and complicate this disease. Bad hygienic surroundings, the exposure to wind, dust, impure atmosphere, as in crowded tenements, should also be mentioned as exciting causes.

Treatment.—In both the simple and severe cases the local treatment demands the removal of the masses which form upon the cilia, which while they remain, tend to increase by their irritation the inflammation of the lids. This is not so readily done as might be supposed, as the crusts thus formed are hard, not readily soluble, and their mechanical removal often painful, and particularly so when the eyelashes are removed with them.

For the removal of these masses the lids should be bathed in warm water in which a little bicarbonate of soda or borax has been dissolved, and as soon as the crusts have been moistened they are removed by drawing the cilia through the thumb and forefinger, or picked from the lashes by the aid of a pair of forceps. These crusts once thoroughly removed, the free mar-

gins of the lids should be smeared with vaseline or cosmoline in their plain forms, or in combination with mercury or graphites in the form of an ointment. The use of these preparations hastens the recovery by lessening the irritation of the inflamed lid, and by their specific remedial effect when thus applied. The effort should be made to have the accumulations upon the lid-edges removed as rapidly as they form to prevent the increased irritation caused by their presence.

When blepharitis does not respond promptly to treatment, the refraction of the eye must be examined, and when found affected, glasses which properly correct the ametropia must be worn constantly.

Occasionally the presence of lice (*Phthirus ciliarum*) upon the lashes simulates blepharitis or causes it. The lice are to be picked off, the nit which clings to the cilia destroyed, and the lid-margins anointed with mercurial ointment to prevent their redevelopment.

REMEDIES.

Aconite.—Indicated in an acute attack, but such cases are extremely rare, and when occurring, result from exposure of the eyes to dry cold winds during long drives. The lid-margins are swollen, hot and dry, and there is more or less inflammation of the conjunctiva accompanying it.

Graphites.—The action upon the edges of the lid is very marked, and is perhaps the most useful remedy we possess for the chronic form of blepharitis, particularly when occurring in strumous subjects and accompanied by the moist, fissured and easily bleeding, eczematous eruptions on the cheeks or behind the ears, which are so promptly cured by this remedy. The swelling of the margins of the lids is variable, in color pale red, and crusted with dry scabs which cover spots of ulceration, or numerous fine scales are found on the skin and among the cilia, which can be brushed off. There is much itching, burning and biting of the lids which the patient tries to relieve by rubbing, but this only aggravates the trouble. In many cases there is a fissured condition of the skin of the outer canthus, which bleeds readily from rubbing or opening the eyelids. The cure is hastened by the application of the graphites ointment to the lids at night.

Mercurius.—The various forms of mercury are extremely useful in blepharitis, the merc. sol. or vivus more frequently perhaps than the others. The lids are much thickened, red, and often ulcerated, with sensitiveness to touch, heat and cold. The lid conjunctiva is hyperemic, or inflamed, with an acrid lachrymation which increases the irritation of the lids. There

is an aggravation of the whole condition from exposure to the light and heat of fires, or in the evening from artificial light. The local application of an ointment containing grs. ii of the merc. precip. alb. or the merc. iod. flav. to 13 of vaseline will be found very useful.

Merc. cor. and prot. present similar symptoms, but in a more marked degree and where there is a pustular eruption on the parts about the eye or upon the conjunctiva. The prescription must be based upon a careful consideration of the circumstances and symptoms as well.

Sulphur.—Suitable in a large number of cases occurring in scrofulous children where the disease is occasioned by the debility following the exanthematous diseases, or appears as the accompaniment of eczema of the face or head, for which sulphur would be indicated. The lids are red, swollen, with numerous small points of suppuration, or are ulcerated along the edges. The characteristic pains are fine, sharp and sticking, though itching, biting, burning and many other sensations may be present. There is usually an aggravation from wet applications to the parts as well as a general aversion to being washed.

Pulsatilla.—In cases arising from some gastric derangement dependent upon consumption of fat foods, there is a great tendency to the formation of styes, and frequently acne of the face. The swelling and redness of the lids may vary, though there is usually a rather profuse, bland discharge which agglutinates the lids during the night. Itching and burning are complained of, with a general evening aggravation and from a close or warm atmosphere, with relief from fresh cold air.

Arsenicum.—Blepharitis occurring in cases where the general condition presents debility, restlessness, thirst, night aggravation, etc. The lids are often puffed and their edges very red, and excoriated by the acrid lachrymation which is a frequent accompaniment of the condition; again the lids may be smooth, red, and shed numerous scales. The pains are burning in character.

Calc. Carb..—Especially adapted to blepharitis in fat, unhealthy children who sweat much about the head. The lids are swollen, edematous and red, with a thick, excoriating, purulent discharge, accompanied by great itching and burning of the lid-margins, particularly at the canthi, with aggravation from damp weather and in the morning.

Calc. Phos. and Iod. are serviceable in strumous cases presenting enlargement of the tonsils and cervical glands, with the eye symptoms of the carbonate.

Hepar Sulph..—The lid-margins are studded with small ulcers which destroy the lid tissue; or they are thick, inflamed and

tender to touch, with small furunculous swellings along the margins or in the meibomian glands; eczematous condition of the face or outer canthus of the lid with cracking and bleeding on opening the eyes. (Compare graphites.)

Petroleum.—Indicated in affections of the lid when there is itching and dryness, with smarting and sticking pains in inner canthus. The skin of the lid is often rough and dry, and frequently accompanied by the occipital headache characteristic of petroleum. The external application of vaseline or cosmoline softens the skin and prevents the rapid formation of the crusts and the gluing together of the lids, and thus by giving relief from this annoyance exerts a beneficial influence.

Antim Crud.—Curative in cases occurring in children where graphites seems indicated, but when administered gives no result. The lids are inflamed, swollen, moist, and there is a pustular eruption upon the lids or upon the face, with frequent agglutination and photophobia in the morning.

Natrum Mur.—Useful where the lids are inflamed and thickened, accompanied by smarting and burning, with some conjunctival inflammation and a sensation of sand in the eyes. The lachrymation is acrid and excoriates the lids and cheek, giving them the characteristic glossy appearance.

Rhus Tox.—Suitable in some cases where there is heaviness and stiffness of the lids, or an edematous condition with profuse lachrymation.

Sepia.—Scaly conditions of the lids, or small points of pustular inflammation at the roots of the cilia, with a sensation as if the lids pressed too hard on the eyeball.

Staphisagria.—Lids with dry, uneven margins or hard nodules, and much itching and sensation of dryness of the eyes in the morning.

Argentum nit., euphrasia, antim. tart. and merc. nit. may be indicated in cases dependent upon, or associated with, conjunctival disease; other medicines may relieve when indicated by the general symptoms of the remedy without special reference to the eye symptoms.

HORDEOLUM, or stye, is an acute inflammation of the cellular tissue of the free border of the lid, and appears close to or involves one or more cilia. At first a small red and hard swelling, very painful to touch, it soon causes much inflammation and swelling of the part of the lid in which it is located or of the entire lid. It becomes developed in three or four days, on its summit a yellowish point appears which usually ruptures and gives exit to a little pus or necrosed cellular tissue.

It is very apt to recur, and children suffer from their re-ap-

pearance singly or in groups for weeks and months. The attacks are due to either such causes as general debility, indiscreet diet or the more local one of eye strain dependent upon errors of refraction, and irritation of the lids from various causes.

The effort to abort the stye is rarely successful; as soon as it is well under way hot compresses are to be applied to hasten the formation of pus, which may be evacuated by a slight incision or left to break itself.

Pulsatilla, hepar sulph., or mercurius at times prevent the extension of the inflammation, but more frequently shorten the course of the attack and hasten resolution. Graphites, sulphur, calc. carb., staphisagria and other remedies, when indicated by the general symptoms, may prevent the recurrence of the styces.

CHALAZION is a small, firm, immovable tumor, hemispherical in shape, which develops in the tarsus and arises from closure of the opening of a meibomian gland and the alteration of its normal secretion. When it is of spontaneous origin it usually disappears in a few days without treatment; when, as is usually the case, its growth is slow, its absorption requires time. In children the causes which determine their development are defective nutrition, the accidental closure of the mouth of one of the ducts or inflammation or irritation of the lid-margin.

The development of the tumor may stop at any stage and remain stationary for an indefinite time, its size varying from a large pin's head to that of a large pea, rarely developing beyond this point.

The only disturbance arising from it, except the unsightly appearance given by it to the lid, is the slight pressure or rubbing of the eyeball by its internal projection.

In the majority of cases occurring in children they are absorbed without operation, but when necessary may be removed by an incision preferably upon the conjunctival surface of the lid and the scooping out of the contents of the cyst.

LACHRYMAL DISEASES are ordinarily rare to the physician, but less so to the oculist; but cases due to arrested development resulting in absence of the lachrymal ducts are not uncommon. The overflow of tears which may be noticed sooner or later by the mother or attendants of the infant indicates the fact that the conduits have not been developed or that the nasal portion has not been delivered of its fetal débris. If such is the case, suppuration of the lachrymal sac of one or both sides takes place in the infant, and its subjective redness, swelling, and the pain as evinced by the child's restless discomfort indi-

cate to us the location of the lesion, which may require surgical interference in the way of incision to relieve the pressure arising from the retention of pus. At times the condition is more chronic, and with the prescription of the proper homeopathic remedy and perhaps the additional aid of some local astringent, or a lotion of the remedy indicated for internal prescription will often, when the punctum of the canaliculus is not occluded or contracted, result in the disappearance of the trouble.

When the sac or duct is congenitally absent or has been destroyed by injury, no relief can be obtained for the persistent overflow of tears which becomes more marked and annoying as the child's years increase.

If the closure or contraction of the punctum is the fault, then it must be opened and attention given to the local inflammation of the conjunctiva resulting from the retention in the conjunctival sac, of the secretions which should have passed into the nose.

When this has been done and no relief given, ample investigation of the patency of the nasal duct should follow, and the problem of trying to imitate nature's intention by the formation of a new opening into the nose is to be considered. In view of the necessity, the latter is more frequently accomplished and often is followed by a satisfactory result for the time, but the ultimate effect is not to the benefit of the growing infant.

What, then, is to be done when the judgment which should come from experience determines an operation not advisable in the individual case? Before mutilating the child it may be well to assist nature to do the work so well undertaken, but yet not completed, and by milder measures enable the child to enjoy that comfort which with harsher methods it could not.

With the aid of cocaine we can in some cases, by the use of fine probes, frequently and gently passed to the bottom of the sac, stimulate its development, and finally obtain a canal of sufficient calibre to enable the passage of the secretions from the eye, which may increase in size with the facial development of the child.

The treatment consists in removing the discharge which accumulates at the inner corner of the eye and the use of a mild eye lotion, as that of borax and boracic acid (grs. x. $\frac{aa}{2}$ to $f\ddot{z}i.$), which lessens the irritation arising from the retention of the lachrymal secretions, and tends to improve the septic condition and thus prevent the extension of the inflammation to the conjunctiva of the lids and eyeball. After the eye has been thoroughly cleansed, some mild astringent solution may be either dropped into the eye or used in a lachrymal syringe, when the

lotion may be thrown directly into the sac and forced through the nasal duct into the nose.

The internal medication consists in the use of such remedies as:

Aconite.—Indicated when the mucous membrane presents the same hypertrophied condition which was present in the conjunctival affection which precedes or accompanies it.

Euphrasia.—Indicated in similar conditions to aconite and frequently follows the latter when the discharge becomes thick, yellow and acrid.

Pulsatilla and Calc. Carb..—When there is a profuse, thick and bland discharge, the concomitants deciding the choice.

Argent Nit..—Catarrh of the lachrymal sac, when the discharge is profuse and the caruncle and semi-lunar folds appear red and inflamed.

Petroleum.—This remedy has a marked action upon the mucous membrane of the lachrymal sac when the obstruction is due to thickening of the mucous folds. The temporary stricture is often relieved by it without the necessity of operative interference.

Calendula.—Particularly useful in obstinate cases, when the blennorrhœa continues after the duct has been opened, and the stricture tends to re-form, and should be applied locally, as well as given internally.

Stannum.—Relieves some cases of blennorrhœa of the sac, where there is a profuse, yellowish-white discharge with sharp pain or itching of the inner canthus, particularly at night.

Arsen. Iod..—Proves useful in curing obstructions of the duct dependent upon acute inflammation and swelling of the nasal mucous membrane. It may be suitable in those cases of blennorrhœa of the duct accompanied by a dry ulcerated condition of the nostrils.

Hepar Sulph..—In inflammatory conditions of the sac with sensitiveness to touch, and free discharge of pus with or without an opened canalculus.

Mercurius.—The discharge is thin, acrid, and often excoriates the lid-margins, or the cheek where the overflow comes in contact with it.

Silica.—There is a bland, whitish discharge of decomposed mucus and pus from the distended sac after the canalculus has been opened and probing begun. It may be also indicated in the recurrent inflammatory attacks of old cases of blennorrhœa of the sac.

Many other remedies have been recommended and have undoubtedly been of service in improving the condition, as arum tr., aurum miur., belladonna, calc. carb., cuprum alumina, hy-

drastis, fluor. ac., kali iod., natrum mur., nux vomica, sulphur and zinc. sulph.

STRABISMUS (squint or cross-eye) is a deviation of one of the eyes when looking at an object, owing to the inability of the child or individual to bring the eyes to bear upon the object so that the visual axes meet at the point of the object looked at. In the normal state of the eye muscles, when any object is looked at, the visual axes of both eyes are directed to the same point of the object. When squint is present, both eyes are not equally turned, one eye being directed toward the object, while the imaginary line of the visual axis of the other, passes to one side or the other of the object, and the squinting eye turns inward (strabismus convergens), or outward (strabismus divergens), or upward (strabismus deorsum vergens), or downward (strabismus sursum vergens).

The six muscles of each eye which enable the eyes to assume their varied positions, are, when normal, so evenly balanced, that all motions of the eye in their associated movements are in perfect co-ordination, and the visual axes meet at the object to which the eyes are directed. When from any cause, one or more muscles present an excess, or a lack of innervation, a disturbance of the normal equilibrium occurs. In the associated action of the eyes there is a deviation from their proper direction in looking at an object, and the deviating or squinting eye takes the direction of the strongest muscle.

Strabismus is an objective symptom arising from various causes. If it occurs in acute illness it is a grave prognostic. It may occur as a reflex of the stomach and intestines, from worms, or other sources of local irritation or inflammation; from meningeal and cerebral lesions, which may cause tonic spasm and paralysis of certain of the eye muscles.

In the convulsions of infancy, squint is often a symptom which becomes permanent, or afterwards disappears. When the eye becomes crossed in the course of tubercular meningitis, it is a symptom of approaching death. Whooping cough, measles, scarlet fever, diphtheria and other diseases of childhood are fruitful causes of strabismus, owing to the enfeeblement of one or more of the eye muscles during or following the disease, and a consequent disturbance of the balance of the relative powers of the muscles. An eye in infancy or childhood during its exclusion from light and the associated visual acts of its fellow, owing to the bandaging which may be necessary for its restoration to health, is not infrequently found to turn inward or outward when recovery from the inflammation or ulceration is complete. When the vision has been partially

lost as a result of such inflammations, the squint may appear at a later period. Various other causes are assigned by the parents for its production, but their etiological value are too often impossible for the ophthalmic surgeon to determine. Squint rarely exists at birth and is developed usually as the result of the close approximation of the infant's near-point and its effort to observe objects attentively. At first it may only be observed occasionally (periodic strabismus), or noticed perhaps in one eye and again in the other (alternating strabismus), or later becomes a permanent squint of one or both eyes.

The common cause of this deformity is that which arises from the imperfect development of the optical apparatus, the power of accommodation or other defects which affect the reception and transmission of the objects looked at. There is still a difference of opinion as to the origin of the strabismus and the loss of vision which occurs in the squinting eye.

That there is either an early innervation of the muscles, an ametropic condition of the refraction, or a loss of central vision in many cases, all agree. The question as to the cause of loss of vision in the squinting eye, whether due to the suppression of the image (amblyopia exanopsia), or defects of the retinal function still remains undetermined.

Treatment.—When strabismus still persists after the acute disease which may have produced it has passed, and the deviation is due to paralysis of the opposing muscle, attention should be directed to the improvement of innervation of the paretic muscle by galvanism and such remedies as may be indicated by the concomitant symptoms.

As the common cause of non-paralytic squint is either a natural preponderance of the internal recti muscles over the external or a hypermetropic or other defective conditions of the refraction with their increased demands for convergence, we have first to correct the ametropic refraction with properly adjusted glasses. This is usually impracticable under four years of age, as while it is possible to determine gross errors of refraction in young children with the ophthalmoscope, the use of glasses thus prescribed are usually of no value and certainly in the majority of cases a matter of great anxiety to the parent or attendant of the child. Bandaging the non-squinting eye for stated periods each day, or the use of atropia to paralyze the accommodation continually or daily exercise of the muscles by prisms afford much better results in the majority of cases in very young children. With increased age, the development of the nose-bridge and the medial sinuses, by increasing the pupillary distance causes a disappearance of many convergent squints. The development of the eye, and its muscles accompanying

that of the head and face results in an ability to co-ordinate the muscles properly. In all cases special attention should be given to improve the general nutrition which is too often at fault. When, however, by the use of such remedies as gels., arg. nit., cicuta, cina, belladonna, hyoscyamus, jaborandi, spigelia and santonine, which may be indicated, both by their direct action upon the muscles at fault or when such other measures as those already stated have been of no avail, it is necessary to make a tenotomy of the muscle which exhibits the greater over-action. When the operation should be done, and its extent, can only be determined by the ophthalmic surgeon, when he has assured himself that all else has been done for its non-surgical cure. In the event of an operation, in young children particularly, it is well to do too little rather than too much, as the full correction or over-correction is not always apparent until some months have passed. The operation is made ordinarily for its cosmetic effect, as in the majority of cases the vision of the squinting eye is not recovered as a result of the operation and should not be expected, nor should the glasses which have been used to correct the ametropia, be expected to be discontinued, as the tenotomy which has corrected the deviation has not removed the refractive error which still persists as an active cause and tends to reproduce the squint. For the technique of the operation reference should be made to special works upon the eye.

When the strabismus is due to paralysis, operative measures are not to be undertaken until all possible chances of recovery have passed, and then not with the expectation that anything can be accomplished except to lessen the cosmetic defect.

HETEROPHORIA, is a term given by Dr. S. T. Stevens, of New York, to a disturbance of the equilibrium of the eye muscles, and is a condition which, while formerly considered under the term muscular insufficiency, has, owing to his investigations, become a condition of greater importance as regards its determination and the effect upon the use of the eyes and those reflex conditions which may follow certain derangements of the eye muscles. In general explanation it may be said if the eye muscles are of normal equilibrium, orthophoria is present; if this equilibrium is disturbed, then heterophoria is present; the visual lines in the former being parallel, while the latter, owing to muscular insufficiency, tend, as in strabismus, to deviate. The heterophorias are subdivided into esophoria, when the visual lines tend inward (insufficiency of the external recti); exophoria, when they tend outward (insufficiency of internal recti); and hyperphoria, when that of either eye tends upward.

D. C.—3

The determination and measure of these muscular deficiencies is accomplished by the use of prisms, which are successively placed before the eye whose muscles' strength is under examination, both eyes being directed upon a candle or other source of illumination at a distance of twenty feet, the thin edge of the prism being placed in the direction of the muscle under examination. The degree of the strongest prism thus used, which still enables the individual to maintain single vision, gives the strength of the muscle tested, and is to be compared with approximate standard for that muscle. Various modifications of this simple test are often necessary to determine the individual loss of equilibrium which may exist, and it should be borne in mind that all such values are only relative.

The causes of the heterophoria are those arising from mal-nutrition, rapid growth, innervations incident to approaching puberty, eye strain dependent upon errors of refraction, and depressions of the muscular and nervous systems accompanying or following exhausting diseases.

The presence of these insufficiencies of the ocular muscles are undoubtedly the cause of much discomfort to children in the use of their eyes, headache, and perhaps more neurotic symptoms, as chorea and epilepsy. It should be said, however, that they are more frequently the reflex of disturbance of remote organs, than they are cause of the many afflictions attributed to them.

The treatment consists primarily in the correction of the nutrition; correction of the optical defects by the use of glasses; the regulation of the use of the eyes; proper exercise and good hygiene; the methodic exercise of the eye muscles by means of prisms, and in the failure of these, a graduated tenotomy of the stronger muscle may be made, but always with the greatest of care, and when only there seems no chance for natural recovery of this weakened power of the muscle in the child.

THE USE OF GLASSES.—Amatus and Friar Bacon discovered during the thirteenth century, that a bit of glass with a convex surface, when placed before their eyes, enabled them again to see with eyes that had become dimmed by the changes incident to their advancing age. This invention and its practical application has been of inestimable advantage to the world; improving sight at all ages, lessening the number of the blind, lengthening the days of the aged, advancing civilization and making the world brighter and better for all.

The question is often asked, Why do so many children wear glasses now-a-days? The frequency with which one now meets children of all ages wearing lenses is rather startling to the

many who do not appreciate the possible needs which require their use nor know of the good which is accomplished by them.

As the child passes from infancy to childhood, defects and disturbances, before unnoticed, now become fully recognized as the child attains an age when it can communicate them. Again, as it begins also to exercise the visual function more closely and for a longer time, this is particularly true of those children who are placed in kindergartens, where the character of some of the work to which they are put is such as to strain the eyes of those much older and stronger. While the work itself does not cause the defects of vision or muscular insufficiencies which we frequently find to be present, it does bring out these defects at an earlier age than under other circumstances. When children begin to use their eyes intelligently upon the objects around them, an inquiry should be made into the power and extent of the visual function. It is an error for the parent to consider that the child must have, by reason of its birth, eyes of the same formation, visual power and endurance as his own. The examination of many thousands of children's eyes exhibits the fact that the proportion of normal eyes is only about 11 per cent.; the balance exhibiting various refractive errors, as hyperopia, myopia and astigmatism in the order given. The presence of these defects interferes both with the vision and also with normal and comfortable use of the eyes. In the effort to see, the child is compelled to exercise an undue amount of force in trying to overcome the defect. The continued effort thus needed results in a rapid exhaustion of that reserve energy which is needed for the maintenance of the normal equilibrium of the general nervous system. Complaint is made of the vision and the eyes, the head suffers, various reflex nervous symptoms are excited and the condition presents a serious aspect.

The confinement of the child to the too often impure air of the school room, the forcing process common to our school system of to-day, the method of education by means of the eye in which learning is acquired by writing, all tend to weaken both the child's physical condition and the eyes as well.

With the acquirement of exact knowledge of the eye condition, its various defects and needs, the ophthalmic surgeon finds that the correction of the errors of refraction by properly adjusted glasses results in a restoration of the vision, relief of the eye strain, improvement of the disposition of the child, in the disappearance of many obscure nervous symptoms which were undoubtedly reflex, and sometimes the cure of an apparent idiocy due to mental deficiency.

The use of glasses at an early age also enables the vision to

be retained in many cases which otherwise would be blind before puberty; again by their use the imperfectly developed eye may be stimulated to such an extent as to acquire during the early years of life a more nearly normal condition. In all cases where glasses may be indicated the greatest care should be exercised in their selection and adaptation to each individual case, as, when not properly prescribed, they are as capable of injury as those which suit the condition are of good.

SYSTEMIC AND GENERAL DISEASES IN THEIR CAUSATIVE RELATION TO EYE DISEASES IN CHILDHOOD.

Intestinal Diseases, when of an exhausting nature, may present such eye complications as ulceration or abscess of the cornea which threaten to destroy the vision and are at the same time usually prognostic of approaching death. Intestinal irritation due to parasites or other causes frequently produces marked affections of the eyes, such as temporary blindness, attacks of weak vision, photophobia, unequal dilatation of the pupils, strabismus, morbid nictitation or nystagmus.

Dentition.—During the eruption of the teeth the eyes exhibit a tendency to exacerbation of any existing eye inflammation and the development of such affections as blepharitis marginalis, phlyctenular inflammation of the cornea and conjunctiva, mild attacks of catarrhal conjunctivitis and hyperemia of the conjunctiva with lachrymation.

Scrofula exhibits usually such superficial affections of the eye as inflammation of the lid-margins, phlyctenular inflammations of the conjunctiva and cornea, which are characterized by tediousness, recurrence, and slowness to respond to treatment.

Syphilis produces a varied and profound effect upon the eyes of children as well as adults, and any tissue of the eye may suffer from its ravages. Acquired syphilis as a cause of congenital changes in the eye has already been referred to, as well as that form of parenchymatous keratitis which appears between the ages of two and fifteen years and rarely in after life. Inflammation of the iris, choroid and retina during the first three or four years of life are not uncommon. Owing to the delicacy of the structures involved, the inflammation resulting from the dyscrasia, together with the persistent character, which marks the attack, the danger to the sight of the child becomes very great.

Rubeoia is a prolific cause of certain eye affections. At its inception a mild catarrhal conjunctivitis with a more or less marked photophobia is usually observed. This condition may

pass rapidly into a muco-purulent conjunctivitis in some cases, or even a dangerous purulent ophthalmia of a croupous variety may follow and be destructive to the eyes. The greater number of eye diseases due to measles, however, appear as sequelae and by no means always following immediately after the attack of the eruptive fever. It would seem, from the great variety of eye affections which are traceable to rubeola, that no other disease of childhood presents so great a number of eyes of impaired vision or function. Undoubtedly the poisonous effect of the exanthem in perverting the nutrition of children already predisposed to malnutrition from various causes, accounts for the development of various diseases of the lids, cornea and conjunctiva, as well as those functional affections of the eye muscles and retina which are so common to the oculist. Affections of the optic nerve, such as optic neuritis, may complicate an attack of measles from retrocession of the eruption or follow after.

Rotheln rarely, if ever, presents any eye complication beyond that of a mild conjunctivitis, which usually disappears with the recovery of the child from its attack of false measles.

Scarlatina, while presenting commonly only a transient hyperemia of the conjunctiva, with increased lachrymation coincident with erythema of the skin, sometimes is complicated with a rapid loss of vision; in one case coming under my observation the blindness existed for four days, and was evidently due to the toxic effect of the disease upon the blood without nephritic complication. Purulent and diphtheritic inflammations of the conjunctiva occur only in those desperate and usually fatal cases of complicated scarlatina. The sequelae of scarlet fever, with the exception of the nephritic and diphtheritic complications, exhibit no such tendency to produce eye disturbances as does measles. When the eruption is repressed, cases of loss of vision have been reported.

Roseola, varicella or *vaccina* produce no eye symptoms of direct value.

Variola may destroy vision from ulceration of the cornea; in rare cases, from the formation of a pustule upon the cornea or upon its margins.

Diphtheria rarely affects the eye in childhood, except by direct inoculation, or from extension from the nose, and when it occurs destruction of both sight and eye follows. As the child recovers from the systemic disease, it is not uncommon to find that the power of accommodation for near objects has been lost. While the prognosis is usually good in these cases, a permanent weakness of the ciliary muscle undoubtedly remains in many cases.

Pertussis in its convulsive stage may cause sudden blindness from hemorrhage within the eye, due to rupture of a blood-vessel of the choroid during the paroxysm, or in other cases from an ischemia of the retina. Spots of effused blood in the conjunctiva from rupture of the capillaries are a very frequent accompaniment of cough paroxysms.

Phlyctenular inflammations of the conjunctiva and ulcers of the cornea are not infrequent sequelae of this disease.

Parotitis rarely exhibits any eye complication, although cases have occurred where there has been a disturbance of the retina with temporary failure of the vision and others presenting a passing effusion in the orbit with paresis of the oculomotor nerve.

Cerebro-Spinal Fever may be complicated with ulceration of the cornea, hyperemia of the optic disc and retina, or even an acute choroiditis, with exudation of lymph in the vitreous and blindness result.

Typhoid Fever seldom occasions any disturbance of the eyes except, in low cases, when an ulceration of the cornea and impaired vision are due to exhaustion. Optic nerve lesions appear as a result of meningeal complications.

Intermittent Fevers in children show a proneness to eye affections, both during the course of the fever and also later. Iritis, phlyctenules, corneal ulcers, strabismus and heterophorias, with all their dangers and discomforts, may attend or follow an attack of malaria.

Rheumatism rarely causes any disease of the eye in children except in extremely rare cases, when an iritis or a mild scleritis may occur.

Diseases of the Heart, even in children, produce certain changes in the eye and disturbance of the visual function, the latter coincident with valvular diseases.

Ex-ophthalmic Goitre, however, is the most common eye disease arising from heart complication. It appears in childhood only at the approach to puberty or soon after the menstrual function has been established. With the enlargement of the thyroid and disturbed action of the heart, there is a marked prominence of the eyes with a partial retraction of the upper eyelids which occasions a peculiar stare characteristic of the disease. When occurring in children it is much more readily cured when early recognized and treated, than in adults.

Hydrocephalus causes impairment of the vision either from pressure exerted directly upon the optic tracts, or from the disturbance of the functional activity of the visual centers by the distention of the brain cortex. The position of the eyes, as they are pushed downward by the pressure upon the roof of

the orbits, gives to the hydrocephalic child a fixed stare which is unique. In the early stages of the disease strabismus or nystagmus may be observed.

Diseases of the Central Nervous System, particularly those of gross character, such as tumors of the brain, rarely find expression in the eyes of children unless due to inherited syphilis, when, as in the adult, optic neuritis may occur before death.

Meningitis, however, presents not only the paralysis of the ocular muscles, but when the inflammation involves the base of the brain, optic neuritis and consequent atrophy are not uncommon.

Diseases of the Sexual System afford many cases of disturbances of the eye relation prior to and at the time of puberty. It is a noticeable fact that a more marked effect is produced upon the eyes of girls at this period than those of boys. The rapid development of the body which occurs at the time of puberty is often preceded by a variety of eye symptoms which are often alarming, in that there is frequently a marked affection of the vision, a disturbance of the equilibrium of the eye muscles from loss of physical tone or occasioned by errors of refraction which before have passed unnoticed. The eye affections thus caused become not only causes of discomfort to the child, but produce reflex effects of both the head and the general nervous system as well. In cases when the headaches, chorea and other now remote nervous symptoms do not disappear when such local causes of irritation as congested ovaries, vaginal inflammation, contracted or adherent prepuce, or the habit of masturbation have been removed, the eyes should be well examined and all refractive errors and muscular defects corrected as far as possible, and often with remarkable improvement in the child's condition.

The effort of nature to establish the menstrual function in the child who has perhaps reached that period of its life when it should pass from childhood to girlhood, is not infrequently attended by various disorders of the eye which may precede the appearance of the menses, accompany them, or remain until the function becomes regular. Morbid winking, chorea of the eyelids and face, spasm of the lids, asthenopia, heterophoria, hysterical loss of vision, neuralgia of the eye, intra-ocular hemorrhages, choriditis, neuro-retinitis and optic neuritis may all arise during this too often trying period of the child's existence. In the male child abnormal nictitation, conjunctival hyperemias, headaches and chorea at puberty are more frequently observed, while the deeper eye affections are uncommon.

Injuries of the Eye in Children—Traumatism of the eye

of the child has, as in adults, the danger to sight or life in proportion to its extent and the location of the injury. Upon the care given immediately after the accident too often depends the recovery or loss of sight. It is impossible to present any single rule for the proper treatment of all the wounds and injuries of the eye which, small as the organ is, when the accidents to which it may be subjected, are so numerous, so frequent, and so dangerous to the delicate organ of sight. No matter how long or broad the experience of the ophthalmic surgeon may be, each case of injury to the eye presented to him may have some variation in cause, location of lesion or effect upon the sight, which will require the aid of all his experience and skill to avoid destruction of sight or eyeball, and yet be compelled to witness the inability of his efforts.

In young children the retention of foreign bodies upon the eyeball or beneath the lids is much more rare than in adults, owing to the lax application of the lids to the surface of the ball, and also to the more active condition of the lachrymal gland, which at this stage of life responds so readily with its shower of tears upon irritation of the conjunctiva. When foreign bodies remain upon the eyeball or beneath the lid, there is apparently less pain referred to the eye than in adults, but a watery, congestive appearance of the eye or an inflammation of the conjunctiva is presented, and the first duty is to look for the cause of the irritation or inflammation which may be discovered in an imbedded bit of foreign substance in the cornea, conjunctiva of the eyeball or lids, the child being less likely to complain of the cause of the trouble than the adult. A drop or two of a two per. cent. solution of cocaine renders the eye sufficiently anesthetic to enable one to examine it comfortably to the patient and thoroughly by the attendant, so as when its location has been discovered to remove it without pain. When not found upon the surface of the globe, the upper lid should be everted, when its location will be found near the center of the free margin or at the angles of the tarsus. Its removal and the application of a cold compress or the instillation of a mild collyrium is usually sufficient to cause a return of the eye to its normal condition in a few hours, unless the irritation and inflammation have been excessive.

The dangerous injuries of the eye from which the child is likely to suffer are those of burns and scalds from hot water, lime and mortar and hot pokers, punctured wounds arising from forks, scissors, pointed sticks or knives. Not infrequently the pet dog, cat or monkey have in my experience produced by accident or intent a laceration of the lids or eyeball. Contusion of the lids or ball from blows or blunt bodies, such as sticks,

balls, pebbles, etc., may cause hemorrhages within the eye, or concussion of the eye sufficient to destroy the function of sight is not uncommon among older children. In all cases the greater danger lies in the effort on the part of the unskilled attendant to do too much. The fact that the child makes little complaint after injury to the eye is too often misleading, as deep injuries to the eyeball, both in children and adults, produce an anesthetic condition which is apt to prevent an early and a proper recognition of their extent or the danger incident to them.

When foreign bodies or masses of dirt or other extraneous substances have found their way upon the ball or beneath the lids, the first thing to do is to remove them with a suitable instrument, or by washing or gently syringing the eye with warm water after rendering the eye anesthetic by cocaine; then ascertain the extent of the injury and its danger to eyeball and sight, and apply cold compresses and such antiseptic collyrium as may be indicated. In cases where penetrating wounds of the eyeball have occurred, while they may seem very slight at first, their ultimate results may be very grave, and the medical attendant can rarely, if ever, err by prescribing a proper solution of atropia, according to the age of the child, to dilate the pupil, and apply cold compresses of ice to the eye. Efforts to determine the extent of the injury by too much examination by unskillful hands result in the destruction of eyes which might be saved.

In all extensive injuries of the eyeball, such as great lacerations or where foreign bodies have been projected within the eyeball, the danger of sympathetic inflammation, which may destroy the sight of the remaining eye, should always be borne in mind. The necessity for the removal of the injured eye to prevent total blindness is often indicated; but in children, where, in the absence of a foreign body within the eye, or the laceration is not too great, it becomes the duty of the ophthalmic surgeon to consider the effect which the immediate removal of the eyeball will have upon the development of the orbit and the side of the face of the injured eye. In all cases, should indications of a sympathetic irritation or inflammation supervene in the other, after injury of one eye, no time should be lost, when by the removal of the injured eye it may be possible to save the sight of its fellow.

Glioma of the Retina and Optic Nerve, or Fungus Hematodes, is usually the only malignant tumor of the eyes of children which we may be called upon to consider. It is almost exclusively a cancer of childhood, occurring usually between the ages of one and twelve years; it may, however, appear as early

as the second month after birth. It is probably hereditary and dependent upon a cancerous dyscrasia.

The earliest symptom is a whitish-yellow, or bluish-white appearance of the pupil, which on examination is found to exist behind the lens, and the eye is devoid of vision. No pain or redness is present, and often the case is not brought for treatment until the eye becomes enlarged, or pain and congestion of the sclera occur. As the tumor grows it advances into the interior of the eyeball, producing atrophy and detachment of the retina as it proceeds. With the ophthalmoscope it appears like a detachment of the retina or inflammatory changes in the vitreous, which closely simulate it, and from which it must be distinguished by the absence of iritic adhesion, and from the history of the inflammation preceding the white or yellowish appearance of the pupil. The appearance of the vessels upon the surface of the bulging mass, which do not correspond with those of the retina, will enable us to designate it from other affections. As the tumor increases in size the intra-ocular tension increases, and the pupil becomes dilated and the child complains of pain from the glaucomatous condition which occurs; other portions of the tissues of the globe become involved with the increase of the tumor, and the lens loses its transparency, the cornea becomes opaque, and all semblance of the eyeball is lost in the protruding mass which extrudes between the lids and appears as a fleshy body, secreting a sanguous discharge and subject to frequent hemorrhages in the advanced stage of the disease, when it is called fungus hematoxodes of the eye.

When the disease is recognized in the early stages, while confined to the retina, the removal of the eyeball with a portion of the optic nerve, which on examination shows no sign of implication, is usually favorable. The case, however, is even then not safe until several months or a year have passed without indications of the return of the growth. In the majority of cases the removal of the eye is not acceded to, or the disease has progressed along the optic nerve so that the brain is often-times affected, or the contents of the orbit have become infiltrated with cancerous cells, so that death follows at an early date, from intra-cranial tumor or exhaustion due to the cancerous cachexia.

Immediate removal of the ball, with as great a portion of the optic nerve as possible, is imperative when the tumor is confined to the interior of the eye. When it has extended beyond the confines of the globe, the question of operative interference is a grave one, as often the complete extirpation of the contents of the orbit affords only temporary relief, the sarcoma-

tous mass, under these circumstances, seeming to acquire fresh energy from the operative measures.

In extremely rare cases the growth is reported to have been checked and the eyeball becomes atrophied, but this is so unusual, and the general tendency of the disease so fatal, that time should not be lost in awaiting probable absorption. After the removal of the growth, it is my practice to place these patients upon carbolic acid 1st dec. in water, a dose three times a day for several months, and good results have occurred from its use.

CHAPTER II.

DISEASES OF THE EAR.

THE infant ear at birth rarely receives as much attention as the eye, unless an absence of the auricle excites the notice of the attendant or some other deformity is apparent. As the ear is not susceptible to those destructive inflammations due to inoculation from the abnormal vaginal secretions of the mother soon after birth as the eye, it naturally requires less careful examination.

CONGENITAL MALFORMATIONS are, however, too often present as a result of a partial or complete arrest of development *in utero*, and the auricles may be so rudimentary as to be said to be absent on one or both sides. When the auricle is rudimentary, the external auditory canal may also be absent or be closed by a fold of skin, which prevents the passage of sound vibrations to the middle ear. When the auricle is congenitally non-developed, there is usually some rudimentary evidence of nature's effort to complete the work, as is shown by the presence of nodules of skin and cartilage in the vicinity of the site of what should have been an auricle. With the non-development of the auricle, there is usually associated a similar defect in the external auditory meatus and also one of the middle and internal ear, so that surgical interference, which might seem indicated for the purpose of opening the canal, is rarely of any value for the relief of the deafness which accompanies the defect.

Various deformities of the external ear may be present as congenital defects, such as a malformed auricle, where a high degree of hypertrophy is exhibited, or arrest of development and an asymmetry of the two ears confront us; clefts and fissures of the auricle, when present, or when the angle of its insertion may give an abnormal expression to those appendages, as where the auricles are too closely applied to the head or are set at a too advanced angle with the plane of the head. Such anomalies, while not necessarily interfering with the child's hearing, oftentimes cause in the child, as it advances in years, a marked disfigurement, and our efforts toward an improvement of the condition are rarely followed by any gain in

esthetic effect. A congenital fistula, situated in the ascending portion of the helix of the auricle, the opening leading into a blind canal, with a thick, creamy secretion, has been recorded, as well as certain fistulas of the canal communicating with the middle ear. The external auditory canal is more often the seat of congenital abnormalities than that of the auricle, and may exhibit throughout the whole extent conditions of contraction or closure due to cuticular or osseous hypertrophy. With a full development of the auricle and a partial or complete closure of the auditory canal, we not infrequently find, after perforation of the skin or bone which seemed to intervene between the external and middle ears, that the canal ends in a cul-de-sac and that the middle ear is without proper development; hence our surgical efforts for the correction of such conditions are usually without good result.

Congenital malformations of the drum-membrane, the middle ear or the internal ear are rarely noticed in infancy, although they may be present. When the child has arrived at a period of its existence when its mental development seems to be at fault, its speech absent or its hearing in doubt, we often find on examination that there are physical defects of the auditory apparatus which are sufficient to explain these deficiencies. They are usually not remediable, so that the child, when both ears are affected, is a deaf-mute and should be afforded that education applicable to the deaf and dumb which is necessary to make such children bread-winners and intelligent members of the community in which they may reside.

At birth the external auditory canal is filled with a plug of detritus, in which epithelial cells from the epidermis lining it are found mixed with the caseous material which covers and protects the fetus during its intra-uterine life; the accumulation soon after birth dries up and falls out, or later, when attention may be called to the infant's ears and the plug found to be still there, its removal is to be accomplished by the use of the aural syringe.

The middle ear cavity may also at birth have retained the debris incident to its development. This accumulation should pass out through the eustachian tube into the throat, leaving the middle ear in condition for the conduction of sound; it probably does not do so as frequently as is supposed. When this condition, is present, its effect is to cause deafness and retard the hearing perception of the infant, and acting as an irritant sets up a suppurative inflammation which liquefies the mass, so that if the eustachian tube is pervious it passes into the throat, or when the latter does not open under the pressure of the accumulation, the drum-head ruptures and those early sup-

purations of the middle ear which occur during the first month or two of infantile life are explained.

The ear of the new-born does not present that completeness of development which is found in the eye at the same period. The orbits of the eyes exhibit in the infant a much greater development at birth than does the temporal bone in which the auditory organ has its location and upon which its development depends. While the eyeballs and their appendages at birth, when normal, closely approximate the size and shape of those of adult life, the ears present much less advancement in the scale of development.

The temporal bone at the time of birth differs materially from that of the adult, and as the essential portions of the hearing apparatus are inclosed in its structure, the development of the ear is in close relation to its ossification, which proceeds slowly and yet always within keeping of that development of the skull which accompanies the normal physical and mental development of the child.

In the early stages of infancy one looks in vain for an auditory canal of full length or a drum-head in the position of that of adult life. The external auditory canal has at this time of infantile life only its cartilaginous portion, is short and the osseous portion undeveloped; the drum-membrane, instead of being visible as in the adult at an acute angle with the lower wall of the canal, is now found almost horizontal with the upper wall.

The mastoid process, which in the adult temporal bone presents a flattened conical mass with apex downward, is only rudimentary in the infant, and only becomes prominent in a physiological or pathological sense with the progressive development of the temporal bone and that of the child.

The examination of the drum-membrane in early infancy, to determine the value of its presenting condition in connection with other symptoms or diseases of the child, is accordingly accomplished only with effort, and variations in its appearance when seen are only of diagnostic and prognostic value after many accurate observations have been made of other ears by the individual examiner. As the infant becomes more developed, its aural affections increase in frequency and extent and the diagnostic value of the examination of its ears of greater importance, not only in determining the local affection, but also eliminating the ear as a possible cause or complication, as well as presenting often a prognostic indication as well as an aid to rational treatment.

The examination of the ears should always be conducted under such circumstances as enable one to see the condition of the meatus and drum-head; the instruments necessary are a

speculum to dilate and straighten the canal, and a mirror reflecting sufficient light to illuminate the meatus and drum-membrane. The view thus obtained, together with a knowledge of the value of the variations from the normal appearance of these parts when presented, aid us to give a greater certainty to our diagnosis and prognosis of diseases of childhood as well as those of adult life. Obstruction to view of the canal and deeper parts is often due to an abnormal lessening of its caliber or from a superabundant secretion of cerumen, so that it is necessary to remove the accumulation with the syringe before the examination can be completed. If the auricle, which was designed for the collection of the sound vibrations, the meatus for sound conduction, the drum-head to receive, the small bones of the middle ear to conduct still further, and the internal ear and auditory nerve, all possess a normal receptive, conductive and transmissive power, then the consciousness and determinative value of the impressions received and transmitted depend upon the functional power of the sound-areas in the cortex.

HEARING IN INFANCY.—The human offspring differs in its higher grade of development from the other mammalia as regards the power of audition immediately after birth. The perception of sound in the young of all the higher forms of life is so dulled during the period immediately following birth that it becomes a difficult matter to separate the possible value of the hearing sense from that of cutaneous impression. The function of perfect hearing in mankind being dependent upon a complete developmental expression of the collective, conductive, transmissive and perceptive apparatus of the organ of hearing, it should not be expected that its perfection is attained when the anatomical and histological portion in infancy are found so imperfect.

In a series of experimental observations which I have conducted at various times upon infants, in the effort to determine the power of their auditory function soon after birth, I have found it difficult, as it is almost impossible to have the surroundings in keeping with scientific experiments, so that repeated observations may be necessary to enable one to arrive at a conclusion.

When an examination of the ears, after the removal of the fetal accumulation which fills the canal, exhibits the normal appearance of the infantile ear, the projection of sounds toward the ear, even when loud, discordant or musical, seem to disturb the ten-day-old infant less than vibrations of the same strength transmitted through the floor, its crib or cradle. At this age

the cutaneous sense appears certainly more acute than its auditory sense.

While the general theory of sound-sensation is still in doubt, there are some theories, such as those which pertain to the reception and transmission of sound impressions as advanced by Helmholtz, which remain as yet undisputed. The mode of reception and transmission in the auditory nervous apparatus, however, remain for investigation and speculative thought.

It is still a question whether the optical memory-pictures of infantile life have a greater retentive value than those memories produced by the sound impressions. Owing to the greater development of the eye as compared with the ear at birth, it is probable that the visual impressions at this period of life are more durable than those of sound.

The auditory center, which is situated in the temporo-sphenoidal portion of each side of the brain, has the inherent power, when properly developed, of analyzing the impression of those complex tones transmitted to it, as well as determining the auditory value of all simple sounds and noises which excite it. It also has the power to distinguish for the individual certain musical tones, when a proper impression has been made upon the organ of corti, and transmitted to the auditory sphere of the brain, which results in a conscious appreciation of their rhythmic blending and the interpretation of their musical significance.

In the infant, after the first few weeks of world life, as it begins its perceptive auditory period, the lower and deeper tones are probably alone perceived, hence the mother's lullaby is of a low, if not always a sweet or musical tone. As the infant advances toward childhood, the voice tone of the mother or attendant becomes higher intuitively as the infant shows appreciation of sounds of higher pitch, which are now necessary for the development of the intricate terminal nervous elements of the cochlea. It may be observed, also, that this change of tones becomes necessary in order to quiet the child, by lessening the effect of the other sonorous disturbing elements, which increase as the infant's senses become more acute.

The organs of sense of the infant, like those of the young of many of the mammalia, are capable of educational development in proportion to their individual tuition and the perfection reached in the design of the intricate, delicate portions of these organs. In all animals sight and hearing are susceptible of more rapid development under early and careful educational endeavors than other organs of sense. The circumstances which surround the infant, or the direction of the educational effort toward one organ or the other, may tend toward the development of the retentive memory of the auditory sphere over

that of the optical center. There seems to be little doubt, however, that when developmental conditions are equal, special education of the retentive powers of one sphere may enable it to surpass the other. It is not improbable that the infant learns to recognize the eyes, and perhaps the face of the mother and her voice, before either the face or voice of the father, the child seeming to retain the memory of the mother, not only from more intimate relation, but because the visual and sound associations of her are more frequently impressed.

The lullaby common to all races contains from an ethnological standpoint an interesting rhythmic scale exhibited in the folk-lore of all races, and while its purpose is to induce sleep of the infant, at the same time it affords the stimulus necessary for the development of its auditory power. In the early period of infancy the tones of the sleep-song can produce only the slightest and most evanescent impression upon the auditory sphere of the child's brain, and yet be sufficient to accomplish their purpose. In the study of the probable extent of the hearing power of the infant, we find that the value of our observations is lessened by possible effect of motion to which the child's head is subjected, in the effort to quiet it. The lullabies of any tongue seem often ineffectual unless accompanied by rocking, or other motions of the mother or attendant, which are transmitted to the infant in its early life, when in the arms, lap or upon the back. The Indian squaw, with her crying papoose upon her back, rarely stops to croon a lullaby, but shortens her steps, and with a lifting motion of the body soon provokes a somnolent condition of her offspring. The Javanese father, with his infant swinging below his chest in a sash hammock, hastens his step at the cry of the child and thus quiets it. The disturbance of the fluid in the semicircular canals of the ear, and the effect upon what might be termed the equilibrium sense of the child thus produced, may explain the apparent more potent effect in the production of sleep-anesthesia than that derived from the most musical lullabies.

Perhaps there may be an analogous confirmation of the theory presented in consideration of the fact that whenever practicable, the music which produces a quickened step in military life carries the soldiers on to victory, perhaps because, in addition to their patriotism, their thought of self is diminished by the effect produced upon the function of the semicircular canals of their auditory apparatus.

CARE OF THE EARS.—The question is often asked of both physician and aurist what should be done in the way of the hygiene of the ears and their protection from disease. The

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ears of the infant when normal require no attention except that necessary for the cleanliness or protection of the auricle; nature has provided every requisite for the proper care of the canal. The washing of the external ear is as necessary as that of any other portion of the child's anatomy; but beyond this external appendage it is both unwise and oftentimes dangerous to go. In the effort to cleanse what appears unclean, the auditory canal may suffer injury from the attempt to remove the natural ceruminous protective covering of the walls of the canal. Attention should more often be given to the coverings of the head and throat, as undue exposure of those parts, more frequently in climates of rapid changes like ours, result in many ear affections; hence it is well in children to provide for the head, ears and throat a light, soft and warm covering during the fall, winter and spring months. In the washing of the ears it is not necessary nor well to manipulate the auricle too much, in the way of pulling, digging or dragging it, as while it may not be especially delicate of itself, its relation to the middle ear is very close and unnecessary efforts expended upon it oftentimes produce deeper changes which affect both the comfort and hearing of the child.

Washing and wetting the head and hair of the child is often deleterious to its ears, particularly so in those children who exhibit an ear-disease tendency and should only be indulged in under the most favorable circumstances and when the care taken is such as may prevent the accession of cold.

Boxing or pulling the ears of the child, while not only cruel, is likely to be followed by disturbances of the drum-head and middle ear which cause inflammation, affect the hearing and may endanger life.

When the ear is in a normal condition water should not be introduced into it by means of a syringe or in any other way, as it tends to produce not only discomfort but disease, and by moistening the drum-head lessens the hearing at least temporarily and often permanently.

CAUSES OF EAR DISEASES IN CHILDREN.—The peculiar and intimate relation existing between the middle ear and the nasopharynx, is a prime factor in the production, during the first few years of life, of the great numbers of ear diseases. The close connection of the ears and throat, favors the disposition to inflammatory affections of the middle ears, which constitute the larger percentage of ear diseases occurring in infancy and childhood. The mucous membrane lining the nasal portion of the pharynx, in which we have the openings of the eustachian tubes, presents in childhood a normal, tumid condition, and is

spongy from the rich blood supply sent to it. Between the openings of the tubes, the adenoid tissue reaches its highest development in the third or pharyngeal tonsil. The tendency is always great in every coryza, angina, exanthem, or other disease which affects the nose, throat or pharynx, from the swelling and inflammation of the mucous membrane of these parts, toward an involvement of the ears. The breathing of damp and impure air may exhibit its deleterious effect upon the nasal and pharyngeal mucous membrane, in the production of an inflammation, or a congestion at least, of the mucous membrane of the eustachian tubes, which interferes with the function of hearing, often before there is any apparent impairment of the child's general health.

The eruption of the teeth or their premature decay are fruitful causes of ear diseases in early life. As the process of dentition extends over a number of years, during which there is a disposition to sympathetic irritation of the ears, aural affections are both common and often persistent.

Too frequent bathing of the infant, or its exposure to changes of temperature soon after birth, imperfect drying of the hair of the child after washing, wetting of the feet, or the retention of damp clothing, result in the frequent production of hyperemia and inflammation of throat and nose, which may implicate the ears.

In this climate there is a great tendency in children of any age to catarrhal conditions of the nose and throat, which is increased by their exposure to the temperature variations often present in a single room; the room may be too hot or too cold, often the atmosphere is too dry or too moist for the individual child, so that the temperatural and the hygrometrical conditions of the air of its surroundings afford a frequent cause of ear complication or the aggravation of an existing catarrhal affection.

The close proximity of the brain to the middle ear in infancy, owing to the very intimate connection of the dura mater to the mucous membrane of the tympanum, gives rise, from the frequent variations of the circulation of the child's brain to which it is subject, to the production of hyperemias and inflammation of the middle ear.

In infancy the commonest causes of diseases of the ear may be stated to be the acute exanthemata, dentition, acute catarrhs of the nose and throat, diphtheria and hereditary syphilis. In childhood and with older children, in addition to the above, typhoid fever and pneumonia furnish frequent ear complications, while scarlet fever is the cause of the destruction of more ears than all the other causes cited.

DISEASES OF THE EXTERNAL EAR.—Few affections of the auricle and external meatus are presented except when eczema of the face or tinea capitis of the head causes by extension an implication of the auricle, or when either disease leaves a subacute inflammation of the canal within, or around the region of ceruminous glands, so that a discharge is present, often purulent in character, which results from the dermatitis. Occasionally the canal is the seat of small boils in the ear due to impaired nutrition.

ACUTE CATARRH OF THE MIDDLE EAR.—Earache is the first subjective symptom of middle-ear congestion and inflammation. Acute catarrh of the middle ear is its common cause. It is rarely present in infancy or childhood from such causes as reflex neuralgias. The pain varies in intensity according to the extent of the inflammatory process and the amount of pressure exerted upon the walls of the tympanic cavity. This pain, which is deep-seated, is increased on pressure below the auricle or by pulling it. Together with the pain, there is a sense of fullness, deafness, noises in the ears and some febrile disturbances, the latter often passing unnoticed.

Etiology.—Of the general causes mentioned, as producing ear diseases, coryza is the most common of those of the acute catarrhs of the middle ear, although all other causes mentioned may excite it.

Treatment.—As the earache is the prominent symptom, the efforts for its relief are mainly in the direction of some local medicament applied to the ear canal. Notwithstanding the fact that the practice of dropping something in the ear on the appearance of earache is, and always has been a common one, yet each year we become more and more impressed with its danger, its unreliability for the relief of the pain, and the fact that from its indulgence a simple attack of acute hyperemia, or catarrh, which should be self-limiting, passes into a more severe and often chronic affection of the middle ear.

Relief is only obtained when the treatment of the congestion or inflammation of the nares and nasso-pharynx is followed by the removal of the accompanying swelling of the eustachian tubes and middle ear. Our efforts should be directed to this portion of the child's head, rather than to the local medication of the outer auditory canal. The use of the air-bag, the nozzle of which has been placed in one nostril, while the other is closed with the finger, is usually sufficient to open the tubes, clear the tympanum of mucus, and often relieves the earache at once.

The application of dry heat to the auricle, canal, or side of the head, by means of a hot cloth, a hop-pillow, or a hot-water

bottle or bag, often gives immediate relief, or lessens the intensity of the pain, and at the same time affords the safest and best of topical applications.

We have at our command a number of homeopathic remedies, such as aconite, belladonna, chamomilla, calcarea, dulcamara, hepar sulphur, pulsatilla and mercurius, which exhibit remarkably quick results in dissipating the disease when properly indicated.

ACUTE SUPPURATIVE INFLAMMATION OF THE MIDDLE EAR.—Acute otitis media catarrhalis by its terminology is limited to such inflammatory conditions of the tympanum in which only serum or mucus are secreted as a result of the congestion or inflammation of its lining membrane. It is, however, always the pathological precursor of the suppurative and more destructive inflammation of the middle ear, and from which it differs only in the intensity of the symptoms and in the formation and collection of pus instead of serum or mucus in this small cavity. As in all cases where pus forms, a corresponding destruction of tissue accompanies it; and when the discharge from the ear is of a purulent character, we should recognize its appearance as an indication that a more dangerous condition than a catarrhal one has involved the ear, with danger to its tissues as well as to the hearing.

When pus is found in the external auditory canal, it is commonly an indication of a rupture of the drum-head, due either to surgical interference (paracentesis), or the result of nature's effort to relieve the pressure of the imprisoned pus behind it, and to lessen the danger of further destruction or complication. Hence, it is usually symptomatic of the presence, or prior existence, of a suppurative inflammation of the middle ear, which has destroyed the drum-head to a sufficient extent to enable the discharge from the tympanic cavity to present itself in the canal. It is to be remembered that it is not always pathognomonic of middle-ear disease, as it may be accounted for by an inflammation or ulceration of the dermoid and osseus portions of the external auditory canal. During infancy or childhood the drum-head is much less dense, ruptures more quickly and easily, and shows a much greater reparative power, than in adult life.

Etiology.—The same causes which produce the catarrhal variety, are still active in the suppurative form. Here, however, scarlet fever is the most prolific of all causes, measles and diphtheria being next in order of frequency. Sea or fresh-water bathing is responsible for a large number of cases in older children.

The symptoms are the same as those of the acute catarrhal form, intensified. The pain is more severe, but is generally relieved by rupture of the drum-head, and the consequent discharge of pus. This rupture may occur within a few hours after the attack has appeared, or more frequently after the earache has lasted two or three days. If the drum-head is examined before this takes place, the membrane is found congested, dull, soggy in appearance and bulging outward; if the examination is made after, the canal or meatus is found full of pus. If the pus is removed from the canal by gentle wiping with absorbent cotton, or gently syringed away, the point of rupture is readily seen by the pulsation which is presented at the spot.

In the course of the disease, there is in the beginning an acute inflammation of the eustachian tube which causes its complete obstruction, so that the secretion of pus, following the inflammation which has already passed to the walls of the middle ear, not being able to find an outlet by way of the tube to the pharynx, is confined in the tympanic cavity. The pressure thus exerted upon the walls, tends to extend the inflammation upward through the roof and involve the brain, backward to the mastoid, or distends the drum-head, and at the same time softens it by the inflammatory products thrown into it, until it finally gives way with a greater or lesser destruction of its tissue. The size of the opening thus made, may vary from the most minute rupture, to complete destruction of the whole drum-head; as a rule, the extent of the rupture or destruction being greatest where the inflammation is accompanied by impoverished blood, as in those malignant cases of scarlet fever, diphtheria and measles, when the destructive process usually involves all the essential portions of the middle ear.

Treatment.—While both the acute catarrhal and the suppurative forms of inflammation of the tympanic cavity tend, like many other acute diseases toward recovery, when the discharge does not cease or the ruptured membrane heal within the first week or two following the attack, the result is to produce a chronicity which increases with the age of the child. Hence, the earlier the treatment is applied, which carries with it a full knowledge of the condition, after a proper and careful examination has been made of the ear, the better the result in reparation of the lost tissue of the membrane of the drum-head, and the restoration of the hearing function as well as the prevention of a chronic condition of the middle ear, which may menace the life of the child and destroy or lessen its hearing at any period of its subsequent life.

The belief, which has been so common in the past, both

among physicians and the laity, owing to their ignorance of the pathological conditions of the ears in these cases, that the child would outgrow the discharge from the ear, has caused deafness and death in thousands of cases, when proper treatment might, at an opportune time, have prevented both. In many cases, similar results have occurred from ill-advised, or too vigorous, treatment in cleansing the ears with the syringe, or by the application of the various preparations which are intended to control the discharge.

In the majority of cases of both the catarrhal and suppurative variety of middle-ear diseases occurring in children, it is usually only necessary to remove as far as possible the discharge by wiping the more external portion of the canal with a swab of absorbent cotton and the application of a little boracic acid to render the secretion less septic. The use of the syringe and the accompanying water with its disinfectant or antiseptic solution added, while washing away the pus at the same time, unless the canal and drum-head are carefully dried with the cotton-swab under a good illumination of the canal and drum-head, results in the retention of a portion of the fluid which, if not already warmed, as all solutions introduced into the ear should be, soon becomes of the temperature of the surrounding parts, and the elements of a poultice, heat and moisture, are presented to the tissues; this is followed by more or less maceration with consequent stasis in the circulation and a retardation of the healing process, and at the same time tends toward the extension of the ulcerative process and further destruction of tissue.

During the last ten or twelve years, with a better knowledge and a wider experience in the treatment of both the acute and chronic suppurations of the middle ear, results of treatment of those conditions have been much more brilliant and satisfactory than those of the years before. The substitution of the dry for the moist treatment, the introduction of boric acid, resorcin, peroxide of hydrogen and other topical remedies to our armamentarium have largely increased our percentage of cures over former years.

As the acute form tends so often to become chronic, we shall find that it is only after the nose and naso-pharynx have received proper treatment, and all anomalous conditions there presented are removed, that the ear disease responds promptly to treatment, relapses do not occur as before, and a permanent cure of the inflammation and its accompanying discharge is secured.

Prognosis.—This is not so favorable as in the non-suppurative variety, but the early intervention of proper treatment

renders the prognosis much more favorable than is generally supposed. The majority of uncomplicated cases occurring in otherwise healthy children terminate in complete recovery. When during scarlet fever, measles or diphtheria this affection appears as a complication, the prognosis is usually bad, as the destruction of the parts of the ear is often extensive, with greater tendency to the formation of adhesions and extension of the ulcerative process, owing to the lowered vitality of the febrile condition.

Results.—Recovery with complete or partial restoration of the hearing power. Chronic suppuration; mastoid complication; periostitis, necrosis and caries of the temporal bone; meningitis; cerebral abscess; pyemia and death.

When in the opinion of the medical attendant it is deemed advisable to perform paracentesis of the drum-head, the most bulging portion, which is usually found to be the lower posterior segment, should be selected for puncture. With a good illumination of the parts a paracentesis knife is carried through the membrane, and upon the withdrawal of the knife a quantity of pus follows through the perforation, usually with considerable relief of both the pain and the inflammation.

In the internal medication for acute suppurative otitis media we find such remedies as aconite, belladonna, calcarea carb., ferrum phos., hepar sulph., mercurius, silicea and sulphur affording good results from their exhibition.

CHRONIC SUPPURATIVE INFLAMMATION OF THE MIDDLE EAR.—This is one of the most common affections of the ear occurring during childhood, almost all cases in which there is a discharge from the ear being due to this disease. It is usually the sequel of the acute form, but cases present themselves in which a tendency to chronicity may be said to be exhibited in the beginning, as in those cases occurring in tuberculous subjects, or when they are the accompaniment of pulmonary phthisis.

Etiology.—Scarlet fever, measles and diphtheria form the most frequent causes, as during the acute period of the ear attack, the destruction of tissue has perhaps been great, the vitality of the parts so lowered by the impoverished blood occasioned by the general disease that the healing tendency is very much diminished. Abnormal conditions of the nose and upper pharynx when present tend to cause the acute variety to pass to the chronic, notwithstanding the aural treatment.

Symptoms and Diagnosis.—The discharge of pus from the ear is the common symptom. The quantity varies in amount from that just sufficient to moisten some portion of the

walls of the tympanic cavity to constant flow from the ear, which fills the canal and flows down the neck or face. There are cases in which the pus found in the middle ear passes through the eustachian tube and is discharged into the throat and finally find its way into the stomach. Deafness is always present, varies in degree, from an almost inappreciable loss to total deafness. This variation is not dependent upon the size or location of the perforation, but upon the changes which have affected the tension and mobility of the drum-head. The ears are rarely complained of; pain is exceptional, unless there is an acute exacerbation of the disease.

The character of the discharge is dependent upon the condition of the tympanic cavity and meatus. The pus in a typical case is then laudable, and as the parts heal the secretion becomes more thin and scanty. When mixed with mucus it is stringy and hard to remove. When the mucous membrane of the middle ear is denuded of its epithelium, very much swollen, or granulatious and soft polypi appear upon its surface, the discharge is often mixed with blood. The odor of the discharge depends somewhat upon the care given the ear; where the pus is allowed to remain and the ears are neglected it becomes very fetid. When the odor is bad in cases where proper cleanliness is indulged in, it is usually due to a diseased condition of the bone, and it is particularly indicative of this when, in addition to its fetor, it presents a brownish color. Occasionally the discharge is made fetid by admixture with an altered secretion from the ceruminous glands.

Perforation of the membrane of the tympanum is the almost invariable accompaniment of chronic suppuration of the middle ear. The presence or absence of the opening alone enables us to determine, when pus is found in the canal, whether the condition is one of middle-ear disease or a diseased condition of the canal. To determine its presence or absence the canal must first be cleaned of any discharge, the deeper parts of the ear well illuminated, when, if the perforation is of any extent, it is readily distinguished by the appearance of the reddish mucous membrane lining the inner wall of the drum cavity in the white frame afforded by the remaining portions of the drum-membrane. When the opening is very small it is only detected by forcing air through the nostril by some method of inflation when, passing through the opening, a whistling sound is heard.

The size and shape of the perforation varies greatly, from the most minute opening to that of complete, or almost complete, loss of the entire membrane. It is usually located in the lower and posterior portion when of moderate size, and when very large commonly involves the lower half. The relation of the

size or location of the perforation to the loss of hearing, as already stated, is a difficult one to determine on inspection. In proportion as the opening lessens or changes the tension of the drum-membrane, or the inflammation which caused it has disturbed the mobility of the ossicles, is the hearing power diminished. If neither the tension nor the free movement of the ossicles is interfered with by the perforation, no serious deafness accompanies it.

The sequelas mentioned under the acute suppurative process are to be noted as occurring more frequently under the chronic form. Such complications always render the prognosis very grave, both as regards life and hearing.

The prognosis in the majority of cases, with the improvement in our methods of treatment, is much more favorable than formerly. But as the condition is always a serious one and as long as it exists is a menace to life, our prognosis must be guarded.

Treatment.—The whole effort in the treatment is to be directed toward the restoration of the tissues of the middle ear to a healthy condition; when this is accomplished the discharge usually ends. The improvement in the condition of the tissues is usually followed by a healing of the perforation when the opening has not been too large. The return of the ear to health restores the hearing in whole or in part, but continued treatment is usually necessary to improve the hearing, when deficient, by lessening the adhesions and other changes which have occurred in the ear as a result of the prolonged suppuration. In the treatment it is necessary to have the discharge removed with sufficient frequency to prevent the maceration of the membrane with which it comes in contact. As already suggested, this is better accomplished by the dry method in which swabs of absorbent cotton are used to remove it. There are some cases, however, in which the syringe is better indicated, and after its use all the moisture left in the ear should be absorbed by cotton introduced for the purpose. The invention of peroxide of hydrogen and its effect, when used in the ear by thoroughly removing and destroying the purulent secretion, has done more than any other remedy in aural therapeutics to increase the percentage of cures in these cases. When the discharge has been thoroughly removed, it has been customary to apply some astringent solution or powder to the inflamed surfaces. There seems to be a consensus of opinion of the otologists of to-day that the application made should be dry, and of the great variety of powders used in this way, boracic acid presents superior claims. In the use of boracic acid the amount applied should vary with the quantity of dis-

charge. If the discharge is full and free, the external canal should be filled with it ; and as the discharge becomes less under treatment, it is better not to pack the passage with the powder, as it is then more likely to cake and form a hard plug which is removed with difficulty and which, when *in situ*, may cause serious trouble by confining the pus in the middle ear. The frequency of its application depends upon the quantity of the discharge and it may require daily repetition of the process. Its introduction into the ear is readily accomplished by the use of the common powder-blower.

After the process has been finished, a small wad of cotton should be placed in the ear to prevent the powder falling out, and also afford protection to the tympanum from atmospheric changes. Proof alcohol may sometimes be applied to the tissues of the middle ear with good effect.

Where exuberant granulations or polypi spring up during the course of the disease, they should be removed by the application of caustics, such as nitrate of silver, resorcin, chromic acid, bi-chromate of potash or perchloride of iron, as may seem indicated from experience for the individual case. The greatest care should be taken in their use to prevent destruction of good tissue and to limit their action to that portion which we wish to destroy. When, as in case of polypi, the mass is too large to be rapidly reduced by applications of caustics or astringents, the use of a wire snare or the curette becomes necessary. After granulations have been destroyed or the polypi removed, it is necessary to treat the part from which they were developed until it has become covered with epithelium or scar-tissue, which prevents their recurrence.

Mastoid complication is very rare, except that superficial form which exhibits itself as an abscess over the mastoid portion of the temporal bone. As the mastoid cells do not develop much before the age of puberty, we do not have the dread complication of true mastoiditis to deal with, as in adult life. The skin over the mastoid often becomes tumid, red and the part painful, and pus forms beneath the skin or periosteum covering the rudimentary cells of the mastoid, and requires only moderate poulticing until the abscess may be lanced with relief to the imprisoned pus without the more extended operation necessary in later life, which requires the opening of the bone cells.

If the single cell or antrum of the child's undeveloped mastoid becomes inflamed and pus forms, the abscess tends to discharge itself through the thin cribriform outer plate of the rudimentary mastoid, and point in the softer tissues covering the part.

Periostitis, caries and necrosis require attention during the

course of the treatment of chronic suppuration as they appear, but like other sequela already mentioned as complications of the disease, they require such care that the discussion of their treatment would be out of place in a chapter devoted to the consideration of those more common diseases of the ear occurring in children.

The general health of the child must in all cases receive due consideration ; proper hygiene and improved nutrition are the greatest of aids in the effort to cure this disease. We often find these patients suffering from dyscrasias, or low conditions perhaps due to malnutrition, and before attempting to cure the ear disease we shall save time if we will devote attention to those measures which would result in the improvement of the general health. A proper, and often a specially nutritious, diet, fresh air, and the improvement resulting from them will again and again indicate to us, that the ear is only a part of the whole, and that the condition of the part depends in its local affection upon the condition of the whole.

When we have removed the exciting causes as far as found, or improved the ear condition as far as possible by such local measures as may be expedient, we should look closely into the symptoms, both local and general, which may give us the indication for the prescription of the homeopathic remedy which will result in the curing of cases which otherwise would go on to further destruction.

Among the remedies which may be indicated, there are few in addition to those already mentioned under the head of the acute variety ; but it will be well in cases of doubt to read carefully the general aural indications of the more common remedies, which may be indicated in ear diseases, and which are found on page 141.

CHRONIC NON-SUPPURATIVE CATARRH OF THE MIDDLE EAR.—This disease has for its most significant symptom an impairment of the hearing. The deafness, while not always readily recognized, is more or less marked, or may even be complete, long before there is more than a suspicion of the defect arising in the minds of the child's attendants. Its beginning in children, as well as in adults, is so insidious that it is only brought into recognition and relief sought, when the deafness arising from it is so great as to become sufficiently noticeable, and to call into question the want of proper intellectual development for the child's age. The child may show slow or no response to calls or queries addressed to it in the ordinary tones of conversation ; when its age is such that otherwise, from a normal hearing apparatus and well-developed function, it should

be able to respond properly to the interrogative sound impressions which are directed to, and impressed upon it.

Symptoms.—The deafness, which varies from day to day, and is worse frequently when the weather is damp or cold, or from coryzas which assail the child, presents the most common symptom.

Subjective noises in the ear are, in the child suffering from this affection, rarely spoken of, except in older children, and even then only when questioned as to their presence. The sounds as noticed by children are usually of a singing or ringing character, and are often absent entirely; or a crackling sound on swallowing is described. The more frequent cause of complaint is that the voice sounds are like those which are produced by many talking in a room; in fact, sounds are confused, and there is no clear conduction or proper reception.

The examination of the canal and of the external meatus reveals, perhaps, a want of cerumen or a hyper-secretion of it. The latter is the more common condition in youth, while its absence is the usual accompaniment of the same condition of the middle ear in the adult.

The drum-head exhibits changes in position and appearance, and when retracted it presents a dimness of color, or loss of brilliancy reveals to us the changes which have occurred in the middle ear, and which account for the loss of hearing in the individual case.

In children old enough to talk, the vowel sounds are often mistaken for the consonants, or mistakes are made in the repetition of words during the testing of the hearing, as "pin" for "man," or "man" for "pin;" or "four" for "more." And it will often be found that the hearing is so deficient, that words are only properly repeated by the child when pronounced in a loud tone within a few feet or inches of its ears.

Earaches occur as the result of an acute exacerbation of the chronic catarrh, and indicate only a passing increase of congestion of, or a severe inflammation of the middle ear.

The external ear, and the tissues in immediate connection with the external auditory canal are often sensitive to atmospheric cold, to touch or pressure, or the necessary manipulation undergone during the washing of the ears.

Sneezing is not uncommonly an accompanying symptom of catarrhs of the middle ear.

Etiology.—The causes which lead so often to affections which produce in infancy, childhood, or adult life direct loss of hearing, have been considered under those diseases of the ear already discussed in this chapter under the topical headings of the acute and chronic suppurative or purulent inflammations

of the middle ear. In the chronic affection of the middle ear, when the disease presents a hypertrophy, hypersecretion of mucus, or a thickening of the membrane lining the cavity or enveloping the ossicles, then diseases to which the parts have already been subjected by the inflammatory processes enumerated, present a direct and indirect causative relation. The sequela of all those diseases of the infant or child which it has passed through may leave as their aftermath an impression upon the essential portions of the auditory organ which finally result in a deafness too often progressive and complete. The exanthemata thus produce directly or indirectly more cases of deafness during the early period of childhood than all other diseases, and present the same proportionate causes of deafness in the adult.

When the factors just mentioned are eliminated from statistics which show the etiological percentage of deafness, we find both in childhood and in adult life, particularly the latter, that the loss of hearing is due to those catarrhal affections of the nose and naso-pharynx which are so common in our climate. One may become as fatigued discussing the question of possible cure of general catarrhs as he does of the consideration of the necessity of having so many bespectacled children about us. The onset of a catarrh, which invades the nose and throat and involves the ear, and which should require early attention, is so often unnoticed in the beginning that it is only when the direct affection of the middle ear exhibits a marked impairment of the hearing, or when a succession of colds affecting the head which are accompanied by a temporary lessening of the hearing-power, finally present as an accumulative effect a hearing-loss which is sufficient to be noticed by the child's attendants.

When the child suffers from recurrent attacks of cold confined in its expression to the head or nose, and as a result breathes through its mouth, or when old enough its articulation has a nasal intonation, or its hearing power is questioned, the examination of the nose, throat and ears may reveal the cause of the discomfort of the child and the condition of the ears which causes its deafness.

There can be little doubt that heredity as well as climate is a predisposing cause of catarrhal middle-ear affections of a chronic nature, with progressive changes which are followed by deafness.

The hygienic conditions of our houses, the defects in ventilation and sanitation, both in our houses and the schools in which we live or place our children, are so often at fault that we have little need to wonder at the increasing number of cases of middle-ear catarrh which daily seek treatment.

Prognosis.—The course of the disease is usually slow; the variations which occur in the mucous membrane, whether one of proliferation or of atrophy, finally result in changes that cause a retraction of the drum-head, the stiffening of the chain of ossicles, and general impairment of at least the receptive and conductive portion of the ear, which is followed by a progressive loss of hearing.

The prognosis in childhood is far more favorable than in adult life. The early treatment of the nose and throat and the direct care of the ears cure and remove the chronic tendency in the majority of cases thus treated.

Treatment.—The treatment of this disease depends upon the exciting causes which have given rise to it and the character of the affection of the tissue of the middle ear. In infancy and childhood the catarrhs of the nose and throat partake of the hypertrophic form, wherein there is a moist rather than the dry catarrh which is found more frequently later in life.

An examination having determined the form of catarrh which involves the nose and throat, we proceed to relieve that by proper treatment, as in so doing we remove the cause of the origin of the middle-ear affection or its aggravation. In the treatment of these parts sprays are of great value, the medicinal components of them depending upon the particular condition of the membranes presented. They may be anti-septic, cleansing or therapeutic, as the judgment of the physician may deem advisable. Snuffing fluids up the nose or the use of the nasal douche should be discontinued by every medical adviser. The danger of exciting acute middle-ear inflammations is great, as when the fluid passes to the post-nasal portion of the pharynx the involuntary action of swallowing being followed by an opening of the eustachian tubes, the fluid is carried into the tube or into the middle ear and an acute inflammation of the tympanic cavity is the result.

Popular catarrh remedies, which from their advertisements should enable us to find in them a cure for all cases of catarrhal deafness, seem, when used, to increase the number of aural affections, by the irritation of the nose and naso-pharynx from insufflation of the powders or snuffing up the fluids of which they are composed.

As the air-passages of the head were designed for the purpose of preparing the air we breathe for its proper change in the lung-tissue, due consideration should be given to the condition of the nose and throat, and at the same time the after-effects which a too vigorous treatment of the parts may have upon the welfare of the child in regard to its lungs or aural organ.

In the effort to remove the exciting or aggravating causes of this disease, there is much to consider in both the improvement of the hygienic conditions of the child as well as the treatment which is to be directed to the aural condition.

Whenever there is a chronic ear tendency, as evinced by occasional deafness or recurrent attacks of ear-ache, or discharge from the ear, the clothing of the child is to be inquired into, as well as its nutrition. Wet feet and damp clothing promote diseases of the aural as well as all other organs of the body. In our climate, which from the writer's observation, is no worse than others, there is a necessity for skin-protection which seems from experience only to be gained by the use of wool underclothing in these cases during all seasons. The adult or the child with a vigorous constitution may replace its flannels with cotton as the season advances toward summer, but we find that the changes from heat to cold to which we may be subjected in this climate provokes, when the skin is not protected by a garment containing in its composition a fair proportion of wool, both aural and general catarrhs.

While all climates may have their defects and at the same time, aggravate, lessen, or cure general and aural catarrhs, when the question is asked, Where we shall take our child that it may be relieved of the effect of the sudden changes incident to its place of habitation, or avoid, or lessen the possible climatic effect upon its catarrhal condition, both general and aural, the climatologist gives only a general rule, which does not enable us to answer the question properly. It does not matter always how good a student one may be of climato-therapy, if he fails to designate as the particular climate in this country or others, or the precise location which, from its altitude, geographical position and average temperature reports, would seem to be best for the individual. No specific direction can be given, even when a knowledge of the local catarrhal condition is beyond doubt, when our efforts to relieve or cure the condition by change to other climates, are followed by results, which should not follow from statistical reports furnished. We may advise that the patient seek in Tennessee, North Carolina, Georgia, Florida, or any of our southern states of the east, or California in the west, or in those intermediate climates of Arizona, New Mexico, or Colorado, which may furnish that particular climate, with its proper altitude, lessened humidity of atmosphere and less marked changes of temperature, which we hoped will be beneficial to him and prove remedial to the individual's catarrhal condition. The altitude and the greater dryness of the atmosphere, due to geographical location, the improvement of

the hygienic surroundings, which latter may after all be the most beneficial in retarding, limiting, or curing this progressive disease of the middle ear, make us often question the value of the clima-to-therapy.

Adenoid growths, and the pharyngeal tonsil, when much enlarged, may require removal. It should be remembered, however, that these adenoid bodies and the enlarged tonsil tend toward disappearance before puberty, so that, except when they are a recognized aggravation of the aural trouble, from direct pressure upon the eustachian tubes, it is better to avoid surgical interference, as the attempt to remove them is often followed by an acute inflammation of the middle ear, with the result of destroying the hearing or aggravating the aural trouble.

The turbinate bodies often present a turgescence, which interferes with the respiration. They are not always the cause of the mouth-breathing which may be present, and while their swollen condition, due to their tumidity, may impede the child's breathing, it is not always necessary to remove them in whole or in part by thermo or electro-cautery, or caustic measures, or in any other manner, as their enlargement is often only temporary and we should consider the need which, both as child and adult, it may have in the future for the membrane which may be thus destroyed. Time will probably develop the fact that the destruction of these membranes and other contiguous portions have much to do with the individual's future systemic economy. When we consider that a pint and a half of serum is secreted every twenty-four hours by the mucous membrane lining the nose and throat, for the purpose of filtering, moistening and warming the air we breathe, it is a question whether these tissues, which nature has provided for the proper protection and sanitation of the lungs, should not be retained as they may be in many cases, or removed or destroyed in the immediate effort which may seem necessary for the temporary relief which perhaps accompanies such measures. Already from my observation, cases present conditions as a result of surgical interference in this direction which, while it has benefited the child at the time, has deprived it of a protection against disease, when better results might have been attained by a purely medical treatment.

Where the hearing becomes so impaired from any cause that the child no longer hears the tones of the human voice, if it is under five years of age its power of speech is also lost, hence, in the effort to prevent deaf-mutism, it becomes necessary to apply the treatment as early as possible. In these cases, while they are undergoing the treatment for the aural catarrh, they should be compelled to keep on talking and not be allowed to

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resort to the sign language. If the ear trouble can be even partly cured, there is a very fair chance of their retaining their speech under these circumstances.

In the treatment of chronic aural catarrh, it is imperative that the eustachian tubes and the tympanic cavity should be thoroughly inflated with air after the method of Politzer. The ordinary air-bag is moderately compressed by the hand, after the nose-piece of the bag has been placed in one side of the nose and the other side closed by the finger. As a rule the inflation is accomplished in the majority of cases with little difficulty; the operation clears the cavity of the middle ear of serum or mucus, replaces the drum-head in position, and is often followed by a marked improvement in hearing, which, however, is as often lost before the succeeding treatment brings with it another inflation. As the condition of the ear improves, the effect of the inflation is more lasting, and finally in cases which are cured becomes permanent.

The action of the homeopathic remedy in this disease is prompt and at times marvelous in cases when the true remedy is prescribed. The remedies which are more frequently indicated are: arsenicum; argentum nit.; aurum mur.; belladonna, calcarea carb.; calcarea phos.; causticum; ferrum phos.; graphitis; hepar sulph.; kali mur.; kali phos.; mercurius dulc.; phosphorus, etc.

The special indications will be found in the general list of aural remedies given on page 97.

INTERNAL EAR.—The internal ear, or labyrinth, in which is lodged the delicate mechanism that terminates the nerve of hearing, is situated just beyond the middle ear, and in adult life well protected by the solidification which comes with the full development of the temporal bone. It is readily affected by diseases and injuries of the middle ear, and also of the brain, with both of which it is intimately connected during child life. The temporal bone, not having reached that growth and compactness which comes in later years, does not afford that protection from both disease and injury which is reached later; hence the internal ear is more susceptible to diseases which destroy its function in early life than in the adult.

The concussion of the head from blows or falls, readily communicates its effect to the labyrinth and the hearing is thus often destroyed. Such diseases as cerebro-spinal meningitis, mumps, hemorrhagic inflammation of the internal ear, and inflammatory extensions from the middle ear to the labyrinth in scarlet and typhoid fevers, and acute or chronic suppurations of the middle ear, furnish a large number of internal ear dis-

eases which, from their invasion of the labyrinth, destroy the hearing and produce in the younger children deaf-mutism.

The destruction of the essential portions of the internal ear are not rare to the aurist, although much less so to the general practitioner. Of the causes which occasion it, twenty-five per cent. are those of meningitis and cerebro-spinal meningitis, while scarlet fever presents the next most frequent cause. These diseases produce internal ear inflammations by direct extension from the brain or middle ear. But such diseases as small-pox and parotiditis in children, also produce internal ear complications which cause destruction of the auditory nerve or of its function. Imperfect development of the internal ear due to pre-natal causes, frequently exhibit, on post-mortem examination, sufficient cause of the infant's deafness.

The symptoms which may indicate an affection of the internal ear in infancy or early childhood, are so often similar to those arising from affections of the contiguous parts, that it is difficult to differentiate between the symptoms which arise from an acute inflammation of the middle ear and that of the internal ear, as one may exist alone or complicate the other, and during their inflammatory stage simulate those symptoms which are presented in affections of the meninges or the brain.

In children too young to express the location of their suffering by words, we may thus be often in doubt as to the organ which is diseased. The cry of the infant, which is always a symptom of discomfort, if not of disease, should require attention, that its comfort may be assured and the possible disease be averted. When the symptoms of affections of more remote organs have, as the possible cause of the child's pain, been eliminated, the diagnosis of the probable ear or brain affection becomes a necessary consideration.

One often finds as much difficulty in distinguishing the "cri céphalique" of meningitis from the "cri" occasioned by acute middle and internal ear disease, as he does in determining the value of those symptoms which indicate a capillary bronchitis or pneumonia in infancy when their possible cause is due to a reflex of middle or internal-ear inflammation, until an examination of the ear is made, or when a punctured or ruptured drum-head gives relief to the sufferings of the child and causes a change of opinion as to the diagnosis and prognosis. In the infant, as we are dependent upon the objective symptoms for our diagnosis and prognosis, the close study of the symptoms presented enhance both their diagnostic and prognostic value. When in the absence of marked increase of temperature and no special variation in the digestion or the action of the

bowels the infant rolls its head from side to side and in its restlessness cries out in that tone which has been designated the "head-cry," or when the movement of the head by the attendant gives evident pain to the child, it is probable that an implication of the ear may be the cause of its suffering rather than an affection of its brain or other portions of its anatomy. The loud and passionate cry of the infant, together with the aggravation from movements of the head and the temporary relief afforded by resting the head upon one side or the other, may give a clue to the real affection. For example, a child is attacked with a sudden fit of vomiting, which recurs at intervals during the several succeeding days and presents a temperature somewhat above the normal with more or less marked chill. Within the first twenty-four hours of the attack no difficulty in hearing is noticed, but the following day brings with it a deafness which is complete. The child's brain remains clear, and no convulsions, paralysis or opisthotonus are present. In a week the child recovers its appetite and indulges in play, but it is noticed that there is complete deafness and that there is also an unsteadiness of its gait, and it requires often to be led to prevent frequent falls. We examine the auditory meatus and the drum-head, and find no variations from their normal condition sufficient to account for the symptoms presented. The close study of the symptoms, however, are followed by a diagnosis of inflammation of the labyrinth. We must differentiate between this affection of the internal ear, which might be termed idiopathic and that which results from hemorrhagic inflammation, which is not uncommon during the infantile period, and those arising from such inflammatory extensions as follow cerebro-spinal meningitis, injuries and complications arising from diseases of the middle ear alone, or accompanied by those diseases which affect the general economy of the child as well, largely by the history as well as the symptoms presented by the disease. Such drugs as quinia, salicylic acid, salicylate of soda, salol and some of the coal-tar products which have come into such prominent favor, have, when administered in individual cases, produced permanent middle and internal-ear changes, which have been followed by loss of hearing and deaf-dumbness as well.

The destruction of the auditory nerve or its function from any cause in children under the age of seven years means to the child, if it lives, not only the loss of audition but also that of whatever power of expression of speech it may have acquired prior to its deafness. Unless early attention is called to it and educational treatment followed, the possible

retention of the vocal expression it may have had, or the acquirement of the power of speech in the absence of audition, is frequently lost.

While treatment of the ear, both local and internal, may be followed with some gain in the hearing in these cases, the results are usually only those which, by the slight improvement gained, aid the child in its proper education as a deaf mute.

It is necessary, then, when medical or surgical relief cannot restore the child's hearing, to advise such measures as may enable the child, by proper education, in its forlorn condition, to acquire by intelligent training, the power of speech in the absence of its hearing.

We have now in all large cities, homes and schools which are designed to meet the necessity for the physical, moral and intellectual training of those children who are both deaf and dumb. The good results obtained from this educational treatment of the diseased conditions, which cause complete deafness in childhood, seem wonderful to even those who have given the matter thought. The instructions afforded in these institutions, which enable the child to gain or acquire the power of speech, from the expression and motion of the lips or the mechanical vibration of the larynx of the teacher when felt by the child, is such as to give to those deaf mutes, which have good intelligence and normal vocal organs, the power of conversing in any language which has thus been taught, and often present a general knowledge and education which seems incomprehensible to those who hear.

Much may be accomplished by treatment, in the way of the absorption of inflammatory deposits in the internal ear, or the dissipation of the effects of the disease which has destroyed its functions by such homeopathic remedies as hepar sulph., silicea, calc. carb., ferrum phos., and the employment of like remedies, strychnia, gelsemium, and the salicylates, which may have a revivifying and stimulating effect upon the auditory nerve. Such adjuncts as electricity, and other local measures which may improve the condition of the middle ear or its throat portion, are to be considered.

When a child has lost its articulation as a result of disease of the internal or middle ear, we should direct the attention of the parents or guardian of the child to the necessity for that educational treatment of the child, which may enable it to acquire a knowledge and education not otherwise attainable, and which may give it the ability to hold a position in the community in which it resides, oftentimes higher than that of some others with normal hearing and less intellectual development.

The education of the deaf and dumb child should be begun

as soon as possible after its deafness has been determined. Every effort should be made to have it learn to articulate and discourage its effort to communicate by signs.

When a child appears stupid, inattentive, or does not keep pace with its associates in the intellectual race at kindergarten or school, humanity demands an investigation of the ears, as well as the eyes of the child, by a competent medical adviser, who may find that the fault is not in lack of cerebral development, but loss of audition. The hearing power of the teacher is frequently less than it should be, and what appears to be only the fault of the child, may be due to impaired hearing upon the part of both the tutor and child, or want of judgment upon the part of the teacher when the child's hearing is impaired. The child at school with imperfect sight or hearing, too often seems to have assigned to it the desk most remote from the blackboard, or the teacher's platform. The teachers of to-day, however, recognize the fact, that they themselves may also have faulty eyes and ears; and when cognizant of such defects, are more charitable to the children under their educational supervision. When complete deafness is present, its recognition is usually easy for the teacher; but when only partial, the child suffers from non-appreciation of its defective hearing, is placed at the foot of the class, and reprimanded for inattention, or said to be stupid. To one who is brought by his professional relation in close contact with these children, who are too often the innocent sufferers of both mental and physical punishment, because of their defective hearing, it seems an earlier consideration of the possible defect should be given in all cases, where other causes which may occasion them are absent, and an examination by an aural expert be advised.

AURAL REMEDIES.—The homeopathic indications of the most common aural remedies are grouped together here, and have been taken from Prof. H. C. Houghton's work on Clinical Otology, as they present the most valuable summary extant.

Aconitum.—In acute suppuration of the middle ear, or for acute symptoms arising in chronic cases.

Aurum Met..—Is indicated in suppurative inflammation of the middle ear when the periosteum of the temporal bone is affected. The subjective symptoms, so far as the ear is concerned, are decidedly negative; but the general ones make the choice between this remedy and fluoric acid, nitric acid, or silicea, easy.

Baryta Muriatica.—Baryta is one of our most valuable remedies, both in suppurative and non-suppurative inflammation of the middle ear. Hardness of hearing, severe buzzing in the

ears, crackling in both ears when swallowing, a reverberation in the ear on blowing the nose.

Belladonna.—In acute inflammation of the middle ear, or when acute symptoms arise in chronic disease.

Calcarea Carbonica applies to the same class of patients as in general diseases—the fat, rapidly growing, large-headed, soft-boned children, or adults who in youth were vigorous, but now fail from low power of assimilation; great weakness, sensitive to cold, damp air. The pains about the head are pressing or pulsating, often semi-lateral; coldness or perspiration of the head; detonation in the ears; meatus filled with whitish, fetid pus or viscid discharge.

Capsicum.—For chronic suppuration. The pains in and around the ear are acute, shooting, pressing, with bursting headache. On the mastoid, behind the ear, a swelling painful to touch.

Elaps Corallinus.—Indicated in the chronic suppurative form of disease, complicated with naso-pharyngeal catarrh; the posterior wall of the pharynx covered with crusts; external meatus full of offensive yellowish-green discharge, which stains the linen green; membrana tympani usually perforated.

Ferrum Phos.—Schussler claims that this salt controls the beginning of disease. "Whilst iron restores to their normal condition the blood-vessels, enlarged by disease, it heals the irritative hyperemia, which is the cause of the first stage of all inflammations." This remedy has been called "tissue aconite." One characteristic may guide to its use—beating in the ear and head; the pulse can be counted in the ear, one patient remarked.

Gelsemium.—While this remedy may be more frequently needed in acute disease of the middle ear, it may be specially effective in mastoid disease, or acute necrosis, complicating acute suppuration.

Graphites.—The relation of this remedy to the nutrition of the skin holds good in dry conditions of the mucous membrane; indeed, we may infer very much of the condition of the tympanum from study of the dermoid layer of the external auditory canal. Hence, the condition is that of sclerosis or proliferous inflammation. The membrana tympani may be opaque and thick, or transparent and very thin, adherent to ossicula or promontory, or perhaps mobile; eustachian tube dilatable, but hearing not improved by inflation. There is one subjective symptom which is characteristic—"hearing improved in a noise."

Hepar Sulphuris Calcarea.—In the suppurative form; membrana tympani perforated; ulceration angry; discharge small

in amount, sour, and of fetid odor; the tissue very sensitive, often covered with white shreds, which cling to the ulcer. Subjective symptoms: soreness in small spots about the ear; itching; patient worse at night and by cold air.

Hydrastis Canadensis stands first among remedies for muco-purulent discharge from the middle ear. In purulent inflammation of the middle ear, with thick, tenacious discharge, more mucus than pus, this remedy is invaluable.

Iodine.—In chronic, non-suppurative disease. Curative in atrophy of mucous membrane, probably by stimulating glandular elements of structure.

Kali Bichromicum.—In chronic suppuration; membrana tympani perforated; the cicatrization of the edges of the perforation complete; the tissues have an appearance as if changed to mucous membrane, and the secretion is often more mucus than pus; the discharge yellow, thick, tenacious, so that it may be drawn through the perforation in strings. The subjective symptoms are lancinations, sticking sensations, that the patients are not able to locate with any degree of positiveness.

Kali Muriaticum.—One of the most effective remedies we have ever used for chronic catarrhal inflammation of the middle ear, specially of the form designated "proliferous." Subjective symptoms, a stuffy sensation in the recent cases, subjective sounds, and deafness are very marked. The objective symptoms are, the naso-pharyngeal tonsil, closed eustachian tube, retracted membrana tympani and atrophied walls of the external meatus.

Kali Phosphoricum.—For suppurative disease, specially chronic form, Schussler says: "Potassium phosphate cures the following diseased conditions: septic, scorbutic bleedings, mortifications, encephaloid cancer, gangrenous croup, phagedenic chancre, putrid-smelling diarrhea, adynamic typhoid condition, etc." From the foregoing indications, we are led to use it in ulceration of the membrana tympani, with or without perforation, in suppuration of the middle ear, the pus being watery, dirty, brownish, very fetid, the ulceration angry, bleeding easily, and showing little tendency to granulate, or secret laudable pus.

Kali Sulph.—For catarrhal disease or suppuration, if the discharge be muco-purulent rather than purulent. The guiding symptom is the color of the secretion, which is yellow, sticky and tenacious.

Mercurius Dulcis.—In chronic catarrhal inflammation of the middle ear. The objective symptoms are those of this form of inflammation,—membrana tympani retracted, thickened and

immovable by inflation; a granular or hypertrophied condition of the pharyngeal mucous membrane. The subjective ones are those of a benumbed, dull feeling between the throat and ear, a pressure in the ear from without.

Mercurius Solubilis.—Otitis following exanthemata, and in scrofulous and syphilitic patients, pain in ear, extending to face and teeth, worse by the heat of bed; excoriation and ulceration of meatus; sensitive to cold; abundant secretion of cerumen or flow of pus and blood; sweating without relief, occurring from cold, when there are hypertrophied tonsils or diseased parotids; pulsative roaring in the affected part; ulceration of the membrana tympani, which bleeds from the slightest touch; constant cold sensation in the ears.

Phosphorus corresponds to a dry condition of the tympanum. One objective symptom, deafness, is interesting in this respect, that the failure is especially for the human voice; noises and musical tones are recognized much more readily than the modulations of voice.

Psorinum.—A remedy closely allied to sulphur. In chronic suppuration, where the symptoms remain unchanged after sulphur, the ulcers scab over rapidly; the pus very fetid, with the ulceration of the membrana tympani; scabby ulcers on the vertex and behind the ears. Subjective symptoms: excessive itching in the ears, so that children can hardly be kept from picking or boring in the meatus.

Pulsatilla.—For acute catarrhal inflammation, or chronic suppuration, when the discharge is a bland muco-purulent secretion. Fever without thirst, relief of pains in the open air, and a peevish, changeable, timid disposition, indicating the nervous depression, are guiding symptoms.

Silicea.—In chronic suppuration; ulceration in cachectic subjects, or those who have been dosed with mercury; in caries or necrosis. Objective symptoms: membrana tympani perforated and irregular; secretion of pus scanty; ulcers deep, and covered with scabs unless frequently cleansed. More repairs of the membrane occur under the use of this remedy, in chronic diseases, than under any other single remedy.

Sulphur.—The indications for this remedy must be sought in general rather than in special objective ones, as they are meager compared with the last-mentioned remedy as well as others. Itching in the ears, drawing or shooting pains in the ears; discharge of pus, stinking, with crusts.

Tellurium.—Curative in chronic suppuration, when the symptoms correspond to the following: a watery fluid, smelling like fish-pickle, which excoriates the meatus and the skin wherever it flows. After the suppuration has ceased, the

membrane has been found cicatrized and corrugated, but not thickened.

Thuya Oc.—The special indication for this remedy is the discharge "smelling like putrid meat." Clinically it has cured granulations in the meatus similar to condylomata.

DISEASES OF THE EAR IN THEIR RELATION TO THE GENERAL ECONOMY OF THE CHILD.—Affections of the ear as well as those of the eye have a causative value in the production of diseases of other portions of the child's anatomy. While the possible complications which may arise and affect other parts of the child's system have been already mentioned in the discussion of the direct inflammatory affections of the ear, it may be well to recapitulate here the general systemic affections, which may accompany or follow diseases of the ear.

When the infant in its distress, presents objective symptoms of suffering sufficient, in the judgment of its attendant, to call a physician for relief, it may be difficult for him to formulate an opinion at once as to the exact lesion which may be present. It should be considered before a diagnosis or prognosis is made, that while the symptoms may be those of meningitis, cerebro-spinal meningitis, capillary bronchitis, pneumonia, cerebral irritation with convulsions, that an affection of the ear may be the cause of the symptoms which may lead to an erroneous diagnosis.

Foreign bodies in the ear may occasion, by irritation of the walls of the canal, a reflex through the third branch of the fifth and pneumogastric nerves, which may result in development of what appears to be true epileptoid convulsions, or, perhaps, even a paralysis, or paresis of parts of the same side of the body as that of the ear which contains the foreign substance. It should also be mentioned that similar foreign bodies may remain in the auditory canal for an indefinite period, without exciting any such reflex disturbances in another child, owing to a less abnormal development of the nerves supplying the auditory meatus, or the absence of a hyper-sensitive condition of the child's nervous system.

There is a form of epilepsy which has its origin in otitis media, usually of the chronic suppurative type, where the attacks are excited by inflammatory thickening, or from irritation of the middle or internal ear, resulting from pressure due to inflammation or from nerve irritation arising during the destruction of the parts. It is more frequently found associated with caries and necrosis of the internal ear, and of the temporal bone. The mastoid, when diseased, also holds a causative relation occasionally. In all cases of epilepsy, where there is a history of

aural disease, or where aural symptoms are present, it is well to examine into the condition of the ear.

Where there is a more or less constant discharge from one or both ears of the child, which from neglect, or want of proper treatment, or even when the best available treatment has not caused its cessation, the child then exists with a condition which menaces its life at all times, and which may at any time on the accession of an increased inflammation due to cold, or the extension of the ulcerative inflammation of the mucous membrane, and periosteum of the middle ear, result in dangerous or fatal complications, such as meningitis of the base of the brain of the infant; that of the convexity in older children, abscess of the brain, phlebitis, thrombosis of the sinuses, paralysis of the face, hemiplegia, mastoid inflammation, caries and necrosis of the temporal bones, epilepsy, chorea, stupidity, idiocy, persistent cough, nausea, or vomiting, or death.

Should the pedologist doubt, from the list presented of diseases of the ear, with their possible complications, or fatal culmination, which are by the aurist to be considered as possible causes before a diagnosis in obscure cases is given, even where no ear affection has been noticed or considered likely to have any bearing upon the condition presented, he will find their importance unquestioned, after the observation and experience which comes from an extended aural practice.

GENERAL DISEASES OF THE CHILD IN THEIR EFFECT UPON THE EARS.—In the discussion of the various diseases of the ear, those which produce more directly an involvement of the organ of hearing, such as dentition, the exanthemata, diphtheria, typhoid fever, pneumonia, bronchitis, catarrhal conditions, and other diseases of the nose and pharynx, have already been partly considered, and as they bear by far the greater causative relation to ear diseases, they demand still further attention. The fact should be noted that affections of the auricle and the external auditory canal result from eczema, or other affections of the skin of the head or face, by an extension of the disease through continuity.

In all cases where an ear affection is noticed, the careful consideration of the general condition of the infant or child is of the utmost importance in the effort to cure the local affection.

Cerebro-Anemia or Hyperemia may produce more or less giddiness, or even marked vertigo, due to circulatory disturbances in the labyrinth with or without impairment of hearing, and is usually associated with disturbance or loss of vision from the same cause. When hyperemia is present there is

usually vertigo, with the complaint in older children of noises in the ear, with or without visual destructions. Anemic conditions more often cause transient loss of hearing with faintness.

Tumors of the Brain, and hydrocephalus, while more common causes of eye changes and loss of vision, produce deafness by affecting the integrity of the tissues of the internal ear. A descending neuritis of the auditory nerve or serous inflammation and destruction in cerebro-spinal meningitis, particularly of the epidemic form, while frequently affecting both the eyes and ears is more likely to impress the ear early in the attack, usually during the first few days, and the serous or suppurative inflammation set up in the internal ear is followed by a more or less complete deafness. Cerebro-spinal fever, in conjunction with meningitis, the latter taking the lesser prominence, are the most frequent causes of destruction of the function of the internal ear, and present the most common cause of deaf-mutism as shown by the census reports. The destruction of the nerve which is exhibited in those cases is due to an extension of the inflammation from the brain.

Meningitis, next to cerebro-spinal meningitis is the most frequent cause of destruction of the hearing function in infancy and childhood, and the loss may be due to the complication of both middle and internal ears.

Nephritis in childhood is rarely cause of an aural affection, except when the nephritic condition is the cause of lowered vitality, then a circumscribed inflammation of the external auditory canal may occur, as in the "cat boils" or small abscesses of the canal, which appear at any age as the result of malnutrition and are often indications of the general condition.

Typhoid Fever, bronchitis and pneumonia should be borne in mind as causes of aural complications which are not uncommon and that deafness, or insomnia, or coma may arise from ear complications. In the grippe influenzas of the last three years the ears have suffered more often from mastoid complications than in the common influenzas, which are too often the cause of uncomplicated otitis media. During childhood, which in our climate is usually limited to the first fourteen or fifteen years of life, typhoid fever presents affections of the middle ear due mainly to the extension by continuity in cases where the catarrhal symptoms are prominent. The mucous membrane of the pharynx and naso-pharynx being commonly subject to inflammations in all fevers, whether typhoid, typhus, remittent or other fevers, the possible ear complications in all febrile conditions are to be thought of. While in a general

sense the cases may not be common to the general practitioner, the aurist has in his practice to examine, treat and relieve many cases of deafness which are complications of these diseases.

Intestinal Diseases.—Affections of the alimentary tract have little connection in a causative way with aural diseases, except in as far as they affect the nutrition of the tissues of the ear, and by aggravating a pre-existing naso-pharyngeal condition of catarrh cause a middle-ear catarrh, acute or chronic, or a suppurative inflammation with all its possible results, which involve the hearing and life of the child.

Dentition.—During the eruption of the teeth the infant often suffers from congestion of the auditory canal and of the drum cavity or the eustachian tube, which is accompanied by severe pain in the ear, the cause of the crying of the child being referred to the swollen gums which are less rarely the seat of, although the indirect cause of, the pain. The relief obtained in such cases from the application of dry heat to the ear enables us to determine the fact that an ear complication due to dental irritation is present. When the irritation is prolonged, a slight discharge of pinkish serum from the engorged blood-vessels appears upon the pillow, or in more severe cases, the external auditory canal fills with pus or muco-pus from middle-ear suppuration upon the rupture of the drum-head. In all cases attention should be directed to the gums, and relief obtained by lancing them whenever it may be deemed advisable.

Syphilis.—In infancy, childhood and adult life the affections of the ear from primary syphilis are extremely rare; an occasional case of chancre of the auricle has been reported. In the infant the syphilitic infection of it may have been pre-natal and the expression of the disease upon the ears that of the tertiary stage.

During childhood a sudden and complete deafness may occur as the result of the inherited dyscrasia, which affects the internal ear, or in other cases the hearing be slowly lost, owing to more gradual disease changes in the middle or internal ear.

Scarlatina.—Of the exanthemata none cause such frequent implication of the middle ear with destructive suppuration, acute and chronic, loss of hearing and all the complications and sequela which may result, than scarlet fever. Next to meningitis and cerebro-spinal meningitis, this disease furnishes the largest number of cases of deaf mutes; according to the last census report 25 per cent. were caused by scarlet fever.

Rubeola.—Measles immediately follow scarlatina in order of frequency as a cause of aural destruction. The implication of

the throat and naso-pharynx in both these exanthems, make the extension of the disease to the ear very easy, and the inflammation thus produced is followed by destruction of the essential portions of the hearing apparatus, and leaves conditions of chronic ulceration, adhesions in the chain of ossicles, and progressive deafness.

Diphtheria.—Statistics show that diphtheria is a frequent cause of deafness, and the direct cause in cases when it is associated with scarlet fever or when the membrane invades the upper pharynx. The malignancy of the disease is such that when the child becomes deaf from the invasion of the middle ear, if it survives the diphtheritic attack, it is likely to become permanently deaf, owing to the destruction in the ear and the subsequent changes in it which follow.

Variola.—In small-pox, the impression made upon the ear is less marked than that upon the eye, as the pustules are rarely if ever found in the ear. Occasionally there is during the course of the disease, a middle-ear suppuration, which, however, should not be considered the result of direct infection.

Pertussis.—Whooping cough not infrequently produces ear complications, as hemorrhages in the drum cavity, or rupture of the drum-head which may occur during prolonged paroxysms of cough. A middle-ear catarrh or suppuration is not uncommon, either during the attack or following it.

Parotiditis.—Mumps rarely cause an implication of the ear during the stage of swelling of the gland, but often after the attack has passed, inflammations of the middle ear may follow. The internal ear may also suffer loss of function as a result of the metastasis of the disease.

Typhoid Fever.—The mucous membrane of the nose and throat are commonly subject to inflammation during typhoid, typhus, remittent or other fevers; for this reason middle-ear complications are frequently presented. Occasionally one or both labyrinths are affected by cell infiltration during the course of the fever which may result in temporary or permanent deafness.

Diseases of the Heart are scarcely ever known to produce any direct effect upon the ears of children.

Diseases of the Central Nervous System cause loss of hearing more or less complete from affections of the internal ear. In the brain, changes in the cortex present such unique phenomenon as deafness for certain words, or "word deafness."

Diseases of the Sexual System.—Those changes in the general system occurring at puberty, as a rule produce less affection of the auditory than those of the visual organs. It is rarely that we find at puberty an appreciable effect of the change in the

sexual system upon the ear; even when noticed, usually causing only an aggravation of a tendency to ear disease which had previously existed.

INJURIES OF THE EAR.—The auricle and outer portion of the canal are rarely the seat of direct injury, except those which result from the attempts to remove foreign bodies from the ear. At times an insect may find its way into the infant's ear while sleeping upon the ground, or even in its crib. The diagnosis of the cause of the infant's discomfort cannot always be readily arrived at, but in the absence of other affections which account for it, a glance into its ear may reveal the presence of an insect; then a few drops of water, oil, or any bland fluid instilled into the ear, will at once quiet the child by drowning the insect, which soon appears in the fluid at the outer portion of the canal.

Occasionally we are called upon to treat a punctured wound which follows the introduction of some sharp-pointed stick or instrument.

In infancy, owing to the more horizontal position of the drum-head, it escapes injury unless much force is exerted. Injuries of the deeper portion of the ear are apt to be followed by meningeal inflammation arising from the trauma.

During childhood, foreign bodies of all kinds are frequently put into the ear by the child or its playmates. The size is always less than the caliber of the meatus and this fact should always be kept in mind. The child never pushes it so far in that with intelligent care, it cannot be readily removed; in the majority of cases, when foreign substances are in the canals, changing the position of the head, by placing the child on a table with the head extending beyond it and the ear containing the foreign body directed towards the floor, a slight pulling downward of the ear, thus straightening the canal, results in the falling of the body by the force of gravity to the floor. If this fails, then no effort should be made to remove it, without first having ascertained its exact nature and position under a full illumination. Even then it is better to use the syringe and water than to attempt its instrumental removal except in the most skillful hands. In the majority of cases, where foreign bodies have been placed in the ear, the danger is always greater of injury to the ear from the misguided efforts at its removal than from the foreign body itself. Ordinarily, an object put in the ear, unless pressing upon the drum-head, which occurrence is very rare, except as the result of an attempt to remove it, may remain there for years without other disturbance than a partial or complete loss of the hearing in the stopped ear.

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Pebble-stones, seeds of all kinds, sufficiently small to pass into the canal, deciduous teeth, shoe-buttons, cork, pieces of cloth, wads of cotton, and various other substances have, in the writer's experience, been removed from the ears, after having remained there for weeks, months and many years without occasioning any disturbance except that of defective hearing. It has been the good fortune of the aurist to relieve what has appeared to be serious neuroses; but when, in the absence of a satisfactory explanation, their cause has led to the examination of the ear where deafness of one ear had been noticed and the removal of a foreign substance, which, pressing upon the walls of the canal occasioned the reflex symptoms, removed all difficulty.

Tumors of the ear or malignant disease are so rare in childhood that they need no discussion here.



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